OWNER'S OPERATING MANUAL

REFLECTION

RS-900 Series

1080p Digital Light Processing™ Projectors
RS-900
RS-900/CineWide
RS-900/CineWide with AutoScope

RUNCO

THE WORLD'S FINEST HOME THEATER PRODUCTS™

TWO YEAR LIMITED WARRANTY

For Projectors, Video Processors and Controllers

Congratulations on your purchase of a Runco video product and welcome to the Runco family! We believe Runco produces "The World's Finest Home Theater Products." With proper installation, setup and care, you should enjoy many years of unparalleled video performance.

This is a LIMITED WARRANTY as defined in the Magnuson-Moss Warranty Act. Please read it carefully and retain it with your other important documents.

WHAT IS COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:

SERVICE LABOR: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of manufacturing defect for a period of two (2) years from the effective date of delivery to the end user (excluding the lamp).

PARTS (not including the lamp): Runco will provide new or rebuilt replacement parts for the parts that fail due to defects in materials or workmanship for a period of two (2) years from the effective date of delivery to the end user. Such replacement parts are then subsequently warranted for the remaining portion (if any) of the original warranty period.

PROJECTOR LAMP: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of a manufacturing defect for a period of six (6) months or 1000 hours, whichever comes first, from the effective date of delivery to the end user. In addition, Runco will provide a new or rebuilt replacement lamp for the lamp that fails due to defects in materials or workmanship for a period of six (6) months or 1000 hours, whichever comes first, from the effective date of delivery to the end user. Such replacement lamps are then subsequently warranted for the remaining portion (if any) of the original warranty period.

WHAT IS NOT COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:

This Limited Warranty only covers failure due to defects in materials and workmanship that occur during normal use and does not cover normal maintenance. This Limited Warranty does not cover cabinets or any appearance items; failure resulting from accident, misuse, abuse, neglect, mishandling, misapplication, faulty or improper installation or setup adjustments; improper maintenance, alteration, improper use of any input signal; damage due to lightning or power line surges, spikes and brownouts; damage that occurs during shipping or transit; or damage that is attributed to acts of God. In the case of remote control units, damage resulting from leaking, old, damaged or improper batteries is also excluded from coverage under this Limited Warranty.

CAUTION: THIS LIMITED WARRANTY ONLY COVERS RUNCO PRODUCTS PURCHASED FROM RUNCO AUTHORIZED DEALERS. ALL OTHER PRODUCTS ARE SPECIFICALLY EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. MOREOVER, DAMAGE RESULTING DIRECTLY OR INDIRECTLY FROM IMPROPER INSTALLATION OR SETUP IS SPECIFICALLY EXCLUDED FROM COVERAGE UNDER THIS LIMITED WARRANTY. IT IS IMPERATIVE THAT INSTALLATION AND SETUP WORK BE PERFORMED ONLY BY AN AUTHORIZED RUNCO DEALER TO PROTECT YOUR RIGHTS UNDER THIS WARRANTY. THIS WILL ALSO ENSURE THAT YOU ENJOY THE FINE PERFORMANCE OF WHICH YOUR RUNCO PRODUCT IS CAPABLE WHEN INSTALLED AND CALIBRATED BY RUNCO AUTHORIZED PERSONNEL.

RIGHTS, LIMITS AND EXCLUSIONS:

Runco limits its obligations under any implied warranties under state laws to a period not to exceed the warranty period. There are no express warranties. Runco also excludes any obligation on its part for incidental or consequential damages related to the failure of this product to function properly. Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages. So the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

EFFECTIVE WARRANTY DATE:

This warranty begins on the effective date of delivery to the end user. For your convenience, keep the original bill of sale as evidence of the purchase date.

IMPORTANT – WARRANTY REGISTRATION:

Please fill out and mail your warranty registration card. It is imperative that Runco knows how to reach you promptly if we should discover a safety problem or product update for which you must be notified.

CONTACT A RUNCO AUTHORIZED SERVICE CENTER TO OBTAIN SERVICE:

Repairs made under the terms of this Limited Warranty covering your Runco video product will be performed at the location of the product, during usual working hours, providing location of product is within normal operating distance from a Runco Authorized Service Center. In some instances it may be necessary for the product to be returned to the Runco factory for repairs. If, solely in Runco's judgment, location of product to be repaired is beyond normal operating distance of the closest Runco Authorized Service Center, or the repair requires the unit be returned to the Runco factory, it is the owner's responsibility to arrange for shipment of the product for repair. These arrangements must be made through the selling Runco Dealer. If this is not possible, contact Runco directly for a Return Authorization number and shipping instructions. Runco will return product transportation prepaid in the United States, unless no product defect is discovered. In that instance, shipping costs will be the responsibility of the owner.

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Runco International products are manufactured under one or more of the following patents: US. Patent 6755540 and Other Patents Pending.

ADDITIONAL INFORMATION:

To locate the name and address of the nearest Runco Authorized Service Center, or for additional information about this Limited Warranty, please call or write:

RUNCO INTERNATIONAL, INC.
Attn: Customer Service Department
2900 Faber Street
Union City, CA 94587
Ph: (510) 324-7777
Fax: (510) 324-9300
Toll Free: (800) 23-RUNCO

RUNCO VIDEO-PRODUCT INFORMATION
RETAIN THIS INFORMATION FOR YOUR RECORDS

_____ _____

Model Purchased Date

_____

Serial Number

_____

Runco Authorized Dealer Name

_____

Address

_____ _____ _____

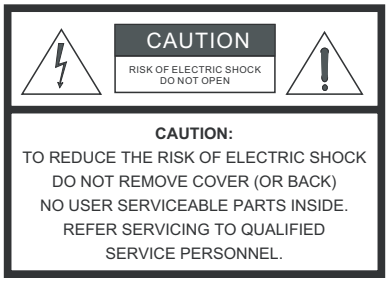
City State/Province Postal Code

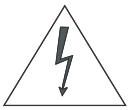
_____ _____

Phone Fax

Important Safety Instructions

Thank you for your purchase of this quality Runco video projector! It has been designed to provide you with the quality of video that is expected in a home theater. For the best performance, please read this manual carefully as it is your guide through the menus and operation.





WARNING
This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any of the ventilation openings. Install in accordance with the manufacturer’s instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for the replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
11. Only use the attachments/accessories specified by Runco.
12. Use only with a cart, stand, tripod, bracket or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. The +12V trigger only outputs 12Vdc signal for triggering. Do not connect to any other power input or output. This could cause damage to this unit.
16. Keep the packing material in case the equipment should ever need to be shipped.
17. The lamp becomes extremely hot during operation. Allow the projector to cool down for approximately 45 minutes prior to removing the lamp assembly for replacement. Do not operate lamps beyond the rated lamp life. Excessive operation of lamps beyond rated life could cause them to explode in rare occasions.

Compliance Information

DECLARATION OF CONFORMITY:

Manufacturer's Name: Runco International, a subsidiary of Planar Systems, Inc.

Manufacturer's Address: 2900 Faber Street, Union City, CA 94587

hereby declares that the products Model Numbers:

RS-900, RS-900/CineWide and RS-900/CineWide with AutoScope

conform with the provisions of:

Council Directive 2004/108/EC on Electromagnetic Compatibility;

EN 55022 "Limits and methods of measurements of radio interference characteristics of information technology equipment" 1998;

EN 55024 "Limits and methods of measurements of immunity characteristics of information technology equipment" 1998;

Including:

- EN 61000-4-2 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test"
- EN 61000-4-3 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 3: Radiated, Radio-Frequency, Electromagnetic Field Immunity Test"
- EN 61000-4-4 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 4: Electrical fast transient/burst immunity test"
- EN 61000-4-5 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 5: Surge immunity test"
- EN 61000-4-6 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 6: Conducted disturbances induced by radio-frequency fields immunity test"
- EN 61000-4-8 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 8: Conducted disturbances induced by power frequency magnetic fields immunity test"
- EN 61000-4-11 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 11: Voltage dips, short interruptions and voltage variations immunity tests"

And:

- EN 61000-3-2 "Electromagnetic compatibility (EMC) Part 3, Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)" 2000;
- EN 61000-3-3 "Electromagnetic compatibility (EMC) Part 3, Section 3: Limitations of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current up to and including 16 A and not subject to conditional connection" 1995;

Council Directive 2006/95/EC and amended by M1 and C1 on Low Voltage Equipment Safety;

EN 60950 "Safety of information technology equipment, including electrical business equipment"

The Technical Construction file required by this Directive is maintained at the corporate headquarters of Planar Systems, Inc., 1195 NW Compton Drive, Beaverton, OR 97006.

Date of Declaration: October 2007

FCC PART 15:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

INDUSTRY CANADA (ICES-003):

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

IMPORTANT RECYCLE INSTRUCTIONS

Lamp(s) inside this product contain mercury. This product may contain other electronic waste that can be hazardous if not disposed of properly. Recycle or dispose in accordance with local, state, or federal Laws.

For more information, contact the Electronic Industries Alliance at WWW.EIAE.ORG.

For lamp specific disposal information check WWW.LAMPRECYCLE.ORG.

DISPOSAL OF OLD ELECTRICAL AND ELECTRONIC EQUIPMENT (Applicable throughout the European Union and other European countries with separate collection programs)

This symbol found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

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1. Introduction

1.1 About This Manual

This Owner's Manual describes how to install, set up and operate the Runco RS-900 Digital Light Processing (DLP™) Projector.

Throughout this manual, the Runco RS-900 DLP Projector is referred to as the "RS-900."

➤ ***Target Audience***

Runco has prepared this manual to help home theater installers and end users get the most out of the RS-900.

Runco has made every effort to ensure that this manual is accurate as of the date it was printed. However, because of ongoing product improvements and customer feedback, it may require updating from time to time. You can always find the latest version of this and other Runco product manuals on-line, at www.Runco.com.

➤ ***If You Have Comments About This Manual...***

Runco welcomes your comments about this manual. Send them to techpub@runco.com.

➤ ***Textual and Graphic Conventions***

Text Conventions: The following conventions are used in this manual, in order to clarify the information and instructions provided:

- Remote and built-in keypad button identifiers are set in upper-case bold type; for example, "Press **EXIT** to return to the previous menu."
- Computer input (commands you type) and output (responses that appear on-screen) is shown in monospace (fixed-width) type; for example: "To select the Component 1 input, type `X133X`."
- All keys with functional names are initial-capped, set in bold type and enclosed in angle brackets. These keys are the following: **`<Enter>`, `<Spacebar>`, `<Control>`, `<Esc>`** and **`<Tab>`**.
- **`<Enter>`** indicates that you may press either the RETURN or ENTER key on your keyboard if it has both keys.

In addition to these conventions, underlining, boldface and/or italics are occasionally used to highlight important information, as in this example:

Note

*A carriage return **must** be used after each command or string.*

Graphic Conventions: These symbols appear in numerous places throughout the manual, to emphasize points that you must keep in mind to avoid problems with your equipment or injury:

TIPS highlight time-saving short cuts and helpful guidelines for using certain features.

Note

NOTES emphasize text with unusual importance or special significance. They also provide supplemental information.

Caution

CAUTIONS alert users that a given action or omitted action can degrade performance or cause a malfunction.

WARNING

WARNINGS appear when a given action or omitted action can result in damage to the equipment, or possible non-fatal injury to the user.

DANGER!

DANGER appears when a given action can cause severe injury or death.

1.2 Using This Manual

Use the following table to locate the specific information you need in this manual.

If you need...	... Turn to page:
Information about obtaining service	iv
General information about the RS-900 DLP Projector	3
Installation instructions	15
First-time configuration instructions	35
Advanced configuration instructions	59
Troubleshooting tips	66
Specifications for the RS-900 DLP Projector	73

1.3 Description, Features and Benefits

The RS-900 DLP Projector offers the astounding picture quality and versatility heretofore associated with more expensive projectors. Their 1920 x 1080 native resolution DLP light engine features Runco's powerful SuperOnyx™ technology for bright, pristine high-definition (1080p) images.

Contrast ratio and dynamic range extend to new heights with Runco's exclusive, electronically-controlled iris system.

The RS-900 is equipped with a precision optics package featuring electronic lens shift and a throw range of 1.87 to 2.20 times the screen width.

The RS-900's illumination system provides two light intensity levels to allow maximum flexibility for screen size, ambient light conditions, brightness and contrast balance, and lamp life preservation. It also has a newly refined cooling system, which increases efficiency and reduces noise levels.

The RS-900 has been engineered to comply with Imaging Science Foundation™ (ISF) standards for maximum home theater image quality. Runco's sophisticated parameters for white balance and color gamut control have also been implemented for precise balance of gray scale and color. The RS-900 incorporates Runco-proprietary de-interlacing technology that provides exceptional scaling and film-to-video (3:2 pulldown) conversion for the most artifact-free images possible.

For uncompromising widescreen reproduction of movies originally filmed in the “scope” (2.35:1) format, the RS-900 can be equipped with Runco’s patent-pending CineWide™ technology, a combination of software, electronics and high-quality anamorphic optics. CineWide maintains constant vertical height on the screen just as in a movie theater. When a viewer transitions from 1.78:1 (16:9) program material to 2.35:1, the image simply gets wider while full height is maintained. Also available with the RS-900 is CineWide with AutoScope™, an enhanced, remote-controlled motorized version of CineWide.

Note

CineWide requires the use of a 2.35:1 or similar aspect ratio superwide format screen.

Discrete IR and RS-232 control make custom installation seamless, while discrete source and aspect ratio selection accommodate any automation control system.

Key Features and Benefits ➤

The RS-900 offers these key features and benefits:

- Native Resolution: 1920 x 1080 (16:9 Native Aspect Ratio)
- DLP system using SuperOnyx™ Digital Micromirror Device (DMD)
- 7-segment color wheel produces wide dynamic range and rich grayscale
- Reflectance Volume Regulation (RVR™) provides for infinitely variable adjustment of the light path through the optics, enabling the perfect balance of black and white levels for each individual installation
- Picture in Picture function allows you to display two inputs on the screen at the same time
- Two (2) HDMI Inputs with High-bandwidth Digital Content Protection (HDCP)
- HDTV Compatible

Parts List ➤

Your RS-900 is shipped with the following items. If any items are missing or damaged, please contact your Runco dealer or Runco Customer Service at (800) 23-RUNCO.

- RS-900 DLP Projector
- Remote Control Unit and two (2), AAA-size batteries
- AC Power Cords (North America, Europe, United Kingdom), 8.2 feet (2.5 meters)
- Source Connection Cables, 9.8 feet (3.0 meters):
  - Composite Video
  - S-Video
  - Component Video
  - RGB (DB15HD to 5xBNC)
  - HDMI to HDMI
  - HDMI to DVI-D
- Serial Communication Cable (D-sub 9-pin female to RJ-11 male), 9.8 feet (3.0 meters)
- Warranty information and registration card
- Runco RS-900 Owner's Operating Manual (this document)

Optional Accessories:

- CineWide™ technology (fixed, secondary anamorphic lens)
- Ceiling mount kit (part number RUHK-004860)
- CineWide™ with AutoScope™ system (secondary anamorphic lens and motorized mount)

Controls and Functions

2.1 RS-900 at a Glance

Figure 2-1 and Figure 2-2 show the key RS-900 components.

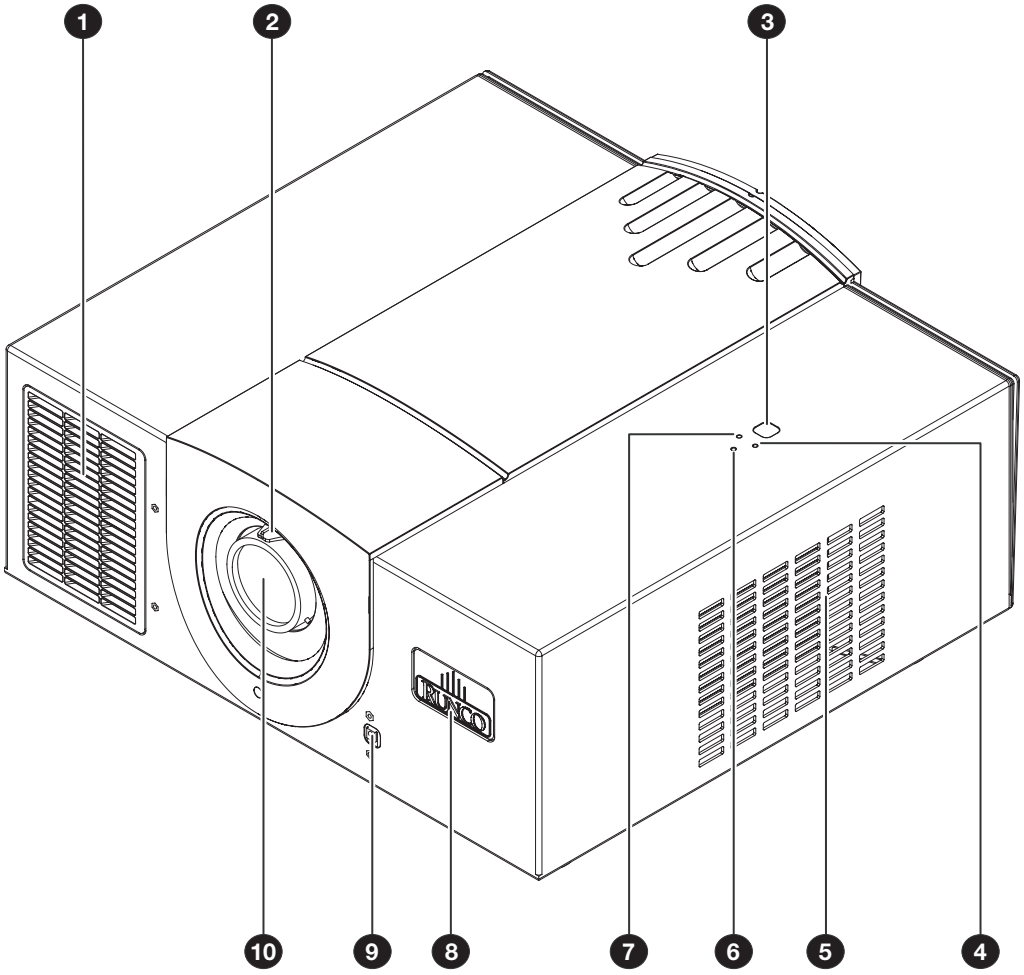


Figure 2-1. RS-900 Front/Side/Top View

1. **EXHAUST VENT**
2. **ZOOM TAB**
   Use this to change the projected image size.
3. **TOP IR SENSOR**

4. **TEMP LED**
   Indicates fan status and internal temperature as follows:
   - Off during normal operation
   - Red when internal temperature is too high or a fan failure occurs
5. **INTAKE VENT**
6. **POWER/STANDBY LED**
   Indicates power status as follows:
   - Orange when the projector is in standby mode
   - Flashes green for approximately 45 seconds after the projector is turned on to indicate that the lamp is warming up
   - Green during normal operation
   - Flashes orange for approximately 110 seconds after the projector is turned off to indicate that the lamp is cooling down
   - Red when an internal failure requiring service has occurred
7. **LAMP LED**
   Indicates lamp status as follows:
   - Off during normal operation
   - Red when the lamp has exceeded its usage life or developed a problem
8. **RUNCO LOGO**
   The logo can be rotated to match the projector orientation: inverted (ceiling-mounted) or upright. To rotate the logo, grip it at the sides, pull it away from the projector and rotate it 180 degrees.
9. **FRONT IR SENSOR**
10. **PROJECTION LENS**
    To adjust the focus, grasp the lens by the outer ring and rotate it.

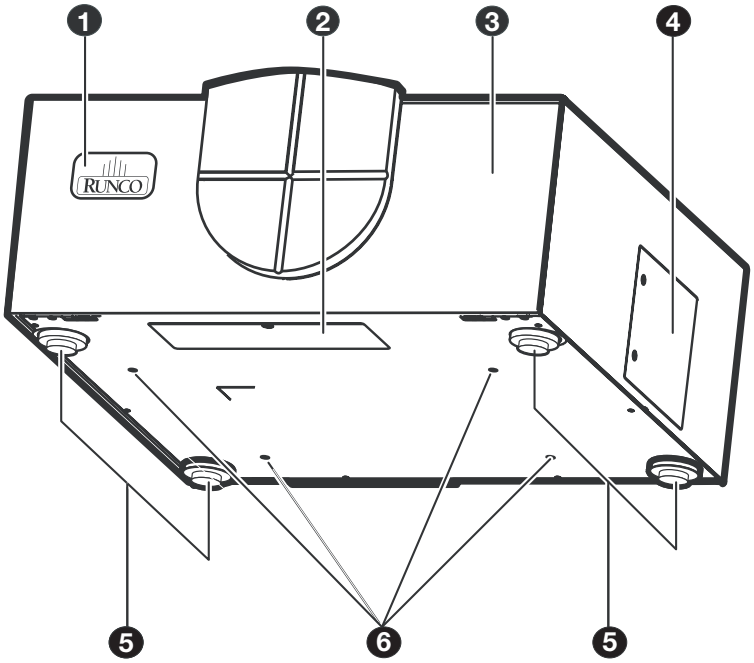


Figure 2-2. RS-900 Rear/Bottom/Side View

1. **RUNCO LOGO**
   The logo can be rotated to match the projector orientation: inverted (ceiling-mounted) or upright. To rotate the logo, grip it at the sides, pull it away from the projector and rotate it 180 degrees.
2. **CABLE OPENING**
   Pass cables through this opening.
3. **CABLE ACCESS DOOR**
   Open to access connectors.
4. **LAMP MODULE COVER**
   Remove this cover to access the lamp compartment.
5. **FRONT/REAR ADJUSTERS**
   Use these to adjust the projector height or projection angle.
6. **CEILING MOUNT HOLES**
   Use these to attach the ceiling bracket to the projector.

2.2 RS-900 Rear Panel

Figure 2-3 shows the RS-900 rear panel.

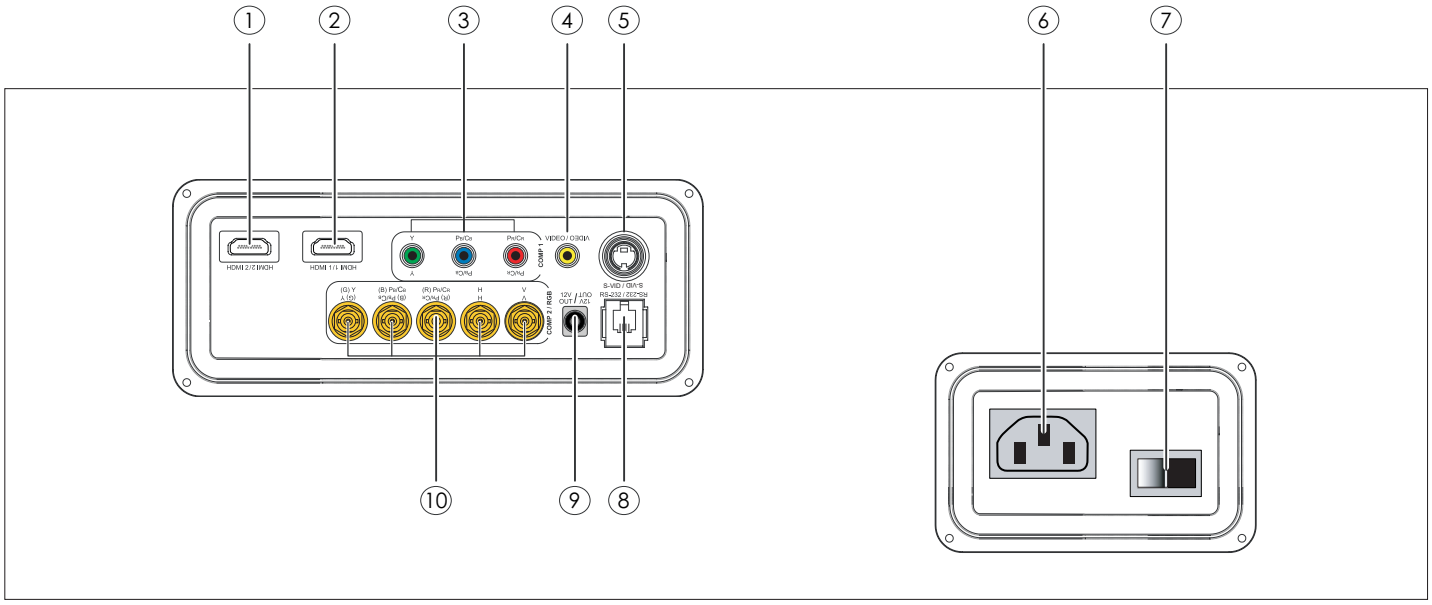


Figure 2-3. RS-900 Rear Panel

1. **HDMI 1 (Digital)**
   HDCP-compliant digital video input for connecting a DVD player or HD tuner with a DVI or HDMI output.
2. **HDMI 2 (Digital)**
3. **COMP 1 (RCA connectors)**
   Standard- or high-definition (480i/480p/576i/576p/720p/1080i/1080p) Component (YPrPb) input for connecting a DVD/HD-DVD/BD player, HD set-top box or other SD/HD source.

   For best results, do not run your DVD player in progressive mode.

4. **COMPOSITE VIDEO INPUT**
   Standard composite video input for connecting a VCR, laser disc player or other composite video source.
5. **S-VIDEO**
   A standard S-Video input for connecting a DVD player, satellite receiver or Super VHS (S-VHS) VCR.
6. **POWER INPUT (100 to 240 VAC)**
   Connect the RS-900 to power here.

7. **MAIN POWER SWITCH**
   Disconnects or applies power to the RS-900.
8. **RS-232 CONTROL PORT**
   A female, RJ-11 connector for interfacing with a PC or home theater automation/control system.
9. **12-VOLT (250 mA) TRIGGER OUTPUT (3.5-mm, mini phono jack)**
   Connection for a 12-volt trigger-controlled device. This can be a retractable screen, screen mask or the Runco CineWide with AutoScope system.
10. **COMP 2 / RGB**
    Five BNCs for connecting either RGB or component (YPbPr), SD or HD video signals. (The RS-900 automatically detects the signal format.)

2.3 RS-900 Remote Control

Figure 2-4 shows the RS-900 remote control, and the paragraphs that follow describe its functionality.

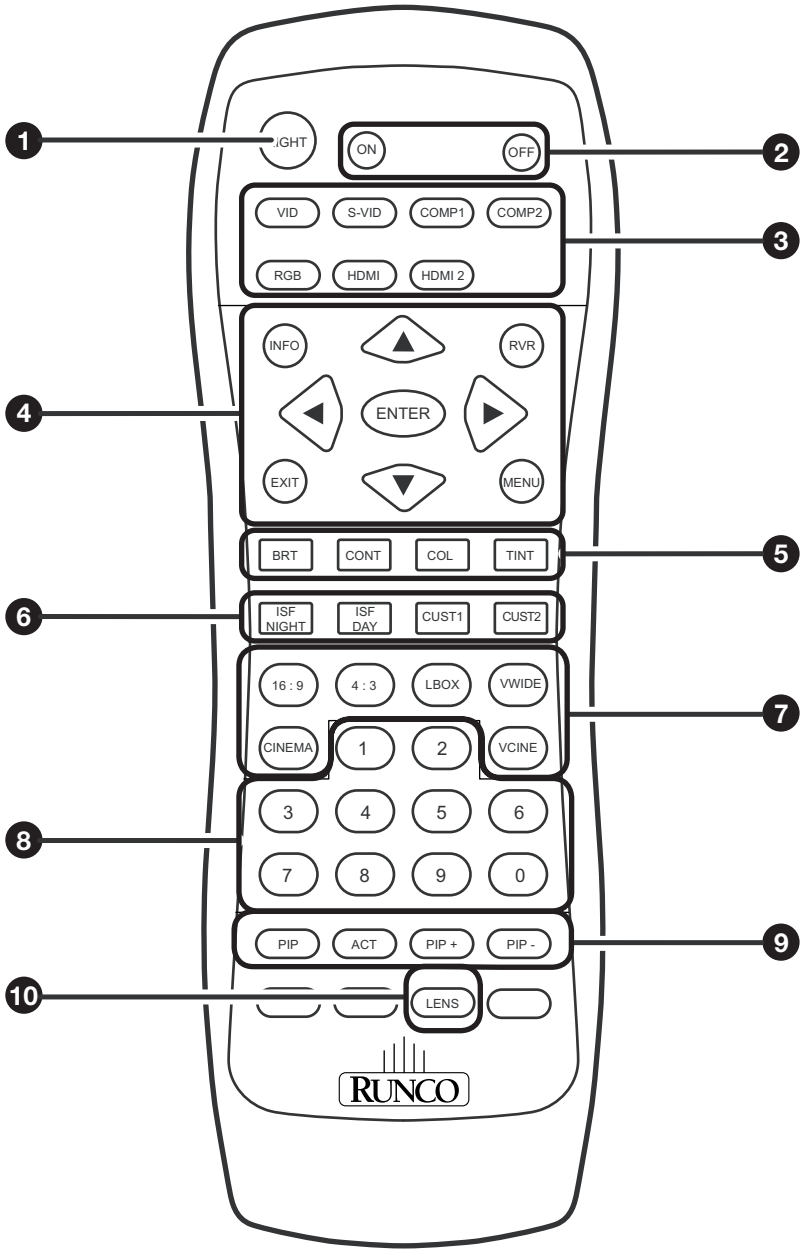


Figure 2-4. RS-900 Remote Control

1. **LIGHT**
   Press to illuminate the buttons.
2. **ON / OFF**
   Use these buttons to turn the projector on or off.

3. **Source Selection Buttons:**

   VID
   Press to select Composite video input as the source.

   S-VID (S-Video)
   Press to select the S-Video input as the source.

   COMP1
   Press to select Component 1 video input as the source.

   COMP2
   Press to select Component 2 video input as the source.

   RGB
   Press to select the Component 2 RGB input.

   HDMI / HDMI 2
   Press to select an HDMI input.

4. **INFO**
   Displays active source, signal resolution, aspect ratio and other projector status information.

   Cursor Keys (▲, ◀, ▼, ▶)
   Use these buttons to select items or settings, adjust settings or switch display patterns.

   RVR (Reflectance Volume Regulation)
   Adjusts the lens aperture (iris) setting according to the ambient light level in the viewing area.

   EXIT
   Press to save menu item setting(s), exit the current menu and return to the previous one.

   ENTER
   Press to select a highlighted menu item or confirm a changed setting.

   MENU
   Press this button to show or hide the on-screen display (OSD) controls.

5. **Picture Adjustment Buttons:**

   BRT (Brightness)
   Press to adjust black level.

   CONT (Contrast)
   Press to adjust white level.

   COL (Color)
   Press to adjust color intensity.

   TINT
   Press to adjust color hues.

6. **Memory Preset Buttons:**

   ISF NIGHT
   Press to recall settings for the current input from the “ISF Night” memory preset.

   ISF DAY
   Press to recall settings for the current input from the “ISF Day” memory preset.

   CUST1 / CUST2
   Press to recall settings for the current input from the “Custom 1” or “Custom 2” memory preset.

7. **Aspect Ratio Selection Buttons**
   Use these buttons to select an aspect ratio directly, as follows:

   16:9
   For viewing 16:9 DVDs or HDTV programs in their native aspect ratio.

   4:3
   Scales the input signal to fit 4:3 display mode in the center of the screen.

   LBOX (Letterbox)
   For viewing LaserDisc movies or non-anamorphic DVDs on a 16:9 screen.

   VWIDE (VirtualWide)
   Enlarges a 4:3 image horizontally in a NON-linear fashion to fit 16:9 full screen display.

   CINEMA
   For viewing 2.35:1 source material.

   VCINE (Virtual Cinema – CineWide-equipped projectors only)
   Selects the Virtual Cinema aspect ratio, used for viewing 16:9 source material on a 2.35:1 screen.

8. **0 - 9**
   Use these keys to enter menu passcodes.

9. **Picture-In-Picture (PIP) Controls:**

   ACT
   Press to switch to the active window in PIP mode.

   PIP
   Press to activate PIP mode.

   PIP+
   Press to enlarge the PIP window.

   PIP-
   Press to shrink the size of the PIP window.

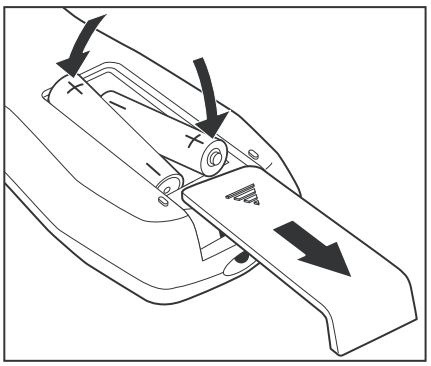
10. **LENS**
    Press to access the lens shift controls.

Notes:

3. Installation

3.1 Remote Control

To install batteries in the remote control, push the battery cover and slide it off. Install the two AAA batteries with the correct polarity and then replace the cover.



◄ ***Notes on Batteries***

- Make sure that the battery polarities are correct when installing the batteries.
- Do not mix an old battery with a new one or different types of batteries.
- If you will not use the remote control for a long time, remove the batteries to avoid damage from battery leakage.

◄ ***Notes on Remote Control Operation***

- Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver on the projector.
- If the effective range of the remote control decreases, or it stops working, replace the batteries with new ones.
- The remote control may fail to operate if the infrared remote sensor is exposed to bright sunlight or fluorescent lighting.
- Ambient conditions may possibly impede the operation of the remote control. If this happens, point the remote control at the projector, and repeat the operation.

3.2 Quick Setup

Table 3-1 gives a quick overview of the RS-900 installation process. The sections following this one provide detailed instructions.

Note *Installation should be performed by a qualified custom video installation specialist.*

Table 3-1. Installation Overview

Step	Procedure	For Details, Refer to page...
1	Choose a location for the projector	17
2	**If installing an RS-900/CineWide with AutoScope:** Install AutoScope lens motor (optional)	21
3	Mount the projector	28
4	Connect signal sources to the RS-900	29
5	Connect external controller to RS-232 port (optional)	32
6	Connect 12-volt trigger output to AutoScope lens motor or other equipment (optional)	33
7	Apply power to the projector	34
8	Change the OSD Language (optional)	35
9	For rear-screen and/or ceiling-mount installations, select the proper picture orientation	35
10	Primary lens adjustments: projected image size (zoom), position (shift) and focus	20, 35
11	Install CineWide anamorphic lens (optional)	36
12	CineWide lens adjustments: position, pitch (angle), geometry and focus	39
13	Projector calibration: adjust the following ***for each input***, starting with Component 1; save settings when finished: Aspect ratio Brightness Contrast Color level Tint Input position	53 through 58

3.3 Installation Considerations

Proper installation of your projector will ensure the quality of your display. Whether you are installing a projector temporarily or permanently, you should take the following into account to ensure your projector performs optimally.

◄ ***Installation Type***

Choose the installation type that best suits your needs: front or rear screen, floor mount or inverted mount. Table 3-2 compares these various installation methods.

Table 3-2. Projector Installation Options

Advantages	Considerations
Front Screen, Floor Mount Installation	
• Easy to set up • Can be moved or changed quickly • Easy to access	• Shares floor space with audience
Front Screen, Inverted Mount (ceiling) Installation	
• Does not take up audience space • Projector is unobtrusive • Projector cannot be accidentally moved	• Installation is more permanent • Projector access is more difficult
Rear Screen, Floor Mount Installation	
• Projector is completely hidden • Projector is easily accessed • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher
Rear Screen, Inverted Mount (ceiling) Installation	
• Projector is completely hidden • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher
Rear Screen, Floor Mount with Mirror	
• Projector is completely hidden • Usually good ambient light rejection • Requires less space behind screen than other rear screen installations	• Requires separate room • Installation cost is usually higher

◄ ***Ambient Light***

In general, minimize or eliminate light sources directed at the screen. Contrast ratio in your images will be noticeably reduced if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

Throw Distance ➤

Throw distance is the distance measured from the front of the projector to the screen. This is an important calculation in any projector installation as it determines whether or not you have enough room to install your projector with a desired screen size and if your image will be the right size for your screen.

You can quickly estimate the throw distance by taking the width of the screen and multiplying it by the lens throw ratio; see Figure 3-1. The result of this calculation tells you roughly how far back the projector should be positioned from the screen in order to project a focused image large enough to fill the screen.

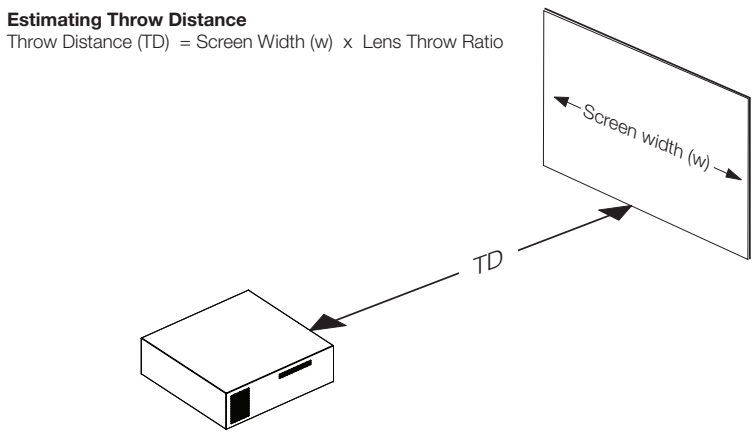


Figure 3-1. Estimating Throw Distance

Table 3-3 gives the throw ratios for the RS-900, RS-900/CineWide and RS-900/CineWide with AutoScope.

Table 3-3. Throw Ratios for the RS-900 Series

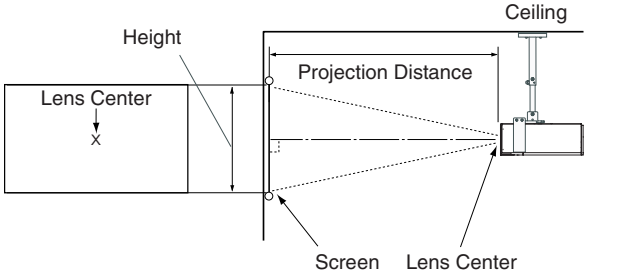
Projector Model	Throw Ratio with Primary Lens Only	Throw Range in inches, with 72.6x40.8-inch (1.78:1) Screen		Throw Ratio with Primary Lens and Anamorphic Lens	Throw Range in inches, with 96x40.8-inch (2.35:1) Screen	
		Minimum	Maximum		Minimum	Maximum
RS-900	1.87 – 2.20	135.76	159.72	(n/a)		
RS-900/CineWide (Whitney Lens)	(n/a)			1.87 – 2.20	179.52	211.20
RS-900/CineWide (Rainier II Lens)	(n/a)			1.52 – 1.69	145.92	162.24
RS-900/CineWide with AutoScope (Rainier II Lens)	1.87 – 2.20	135.76	159.72	1.52 – 1.69	145.92	162.24
RS-900/CineWide with AutoScope (McKinley Lens)	1.87 – 2.20	135.76	159.72	1.40 – 1.65	134.40	158.40

◄ *Vertical and Horizontal Position*

Proper placement of the projector relative to the screen will yield a rectangular, perfectly-centered image that completely fills the screen.

Ideally, the projector should be positioned perpendicular to the screen and in such a way that the lens center and screen center are aligned with each other, as shown in Figure 3-2.

Ceiling Installation



Floor Installation

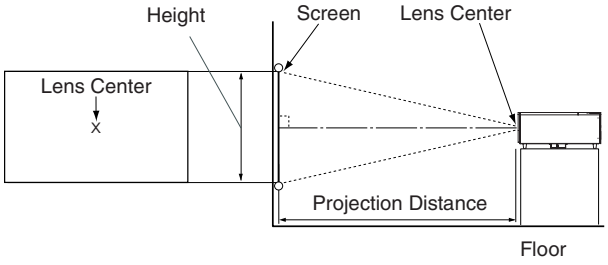
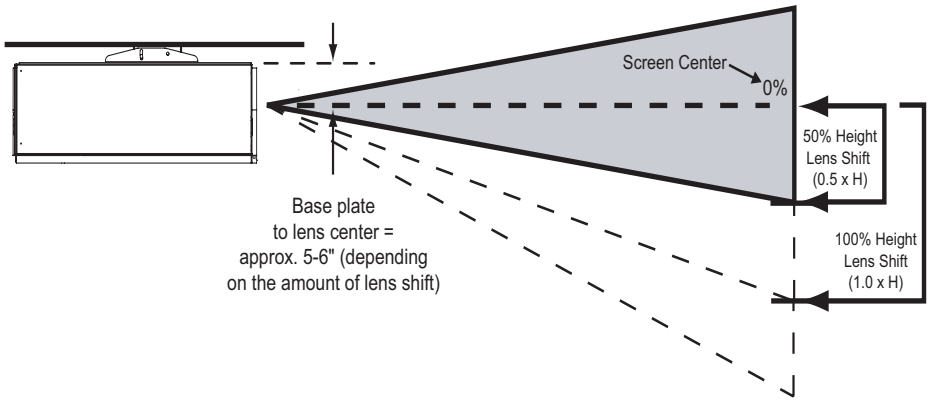


Figure 3-2. Projector Placement

Vertical Lens Shift ➤

If it is not possible to align the projector and screen as shown in Figure 3-2, you can use the lens shift (LENS) controls on the projector remote to center the image on the screen. Vertical lens shift is generally expressed as a percentage of the screen height, as shown in Figure 3-3.



Note: *This is a general example of lens shift. Lenses vary in their shift capabilities.* ***No particular lens or projector is used in this example.***

Figure 3-3. Vertical Lens Shift (Example Only)

The RS-900 provides up to 40% of vertical lens shift above and up to 60% of vertical lens shift below the screen center. For example, with a 100 x 56-inch (16:9) screen, you can shift the image up to 22.40 inches (0.57 meters) above or 33.60 inches (0.85 meters) below the screen center.

Note

1. *With no vertical lens shift, the lens center and screen center are aligned with each other.*
2. ***Vertical lens shift figures are for ceiling mount configurations.*** *For floor installations (where the projector is upright), reverse the up/down vertical lens shift percentages.*

◄ *Folded Optics*

In rear-screen applications where space behind the projector is limited, a mirror may be used to fold the optical path, as shown in Figure 3-4. The position of the projector and mirror must be accurately set. If you are considering this type of installation, contact your dealer for assistance.

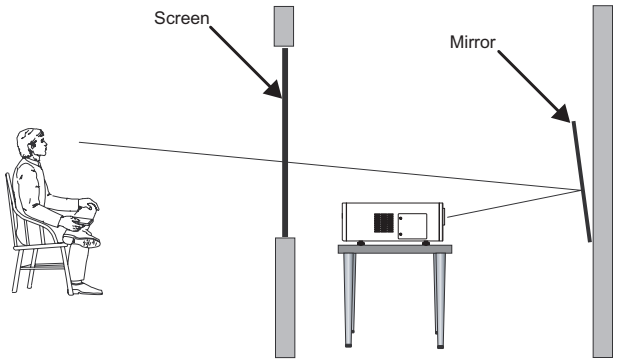


Figure 3-4. Folded Optics

◄ *Other Considerations*

Other considerations and tips that can help improve your installation:

- Keep the ambient temperature constant and below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the projector circuitry, which may affect performance.
- Keep the projector away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers and elevators.

3.4 Installing the Optional CineWide/AutoScope Lens Mount

If you are installing a standard (non-CineWide) RS-900, skip this step and proceed with ***Mounting the RS-900*** (page 28).

If you are installing an RS-900/CineWide with a ***prismatic*** (Whitney) anamorphic lens, proceed with ***Installing the Fixed CineWide Base Plate (RS-900/CineWide, Prismatic Lens)*** (page 25).

If you are installing an RS-900/CineWide with a ***cylindrical*** (Rainier II or McKinley) anamorphic lens, proceed with ***Installing the Fixed CineWide Base Plate (RS-900/CineWide, Cylindrical Lens)*** (page 26).

If you are installing a RS-900/CineWide with AutoScope, proceed as follows to install the AutoScope lens motor.

Note

1. *Do not install the CineWide lens yet, only the fixed CineWide base plate or AutoScope lens motor. You will install the CineWide lens after you install the projector and adjust the primary lens.*
2. *Some components shipped with your projector may differ slightly from what is shown in these instructions.*

Installing the AutoScope Lens Motor (RS-900/CineWide with AutoScope)

Figure 3-5 shows the RS-900/CineWide with AutoScope motor assembly.

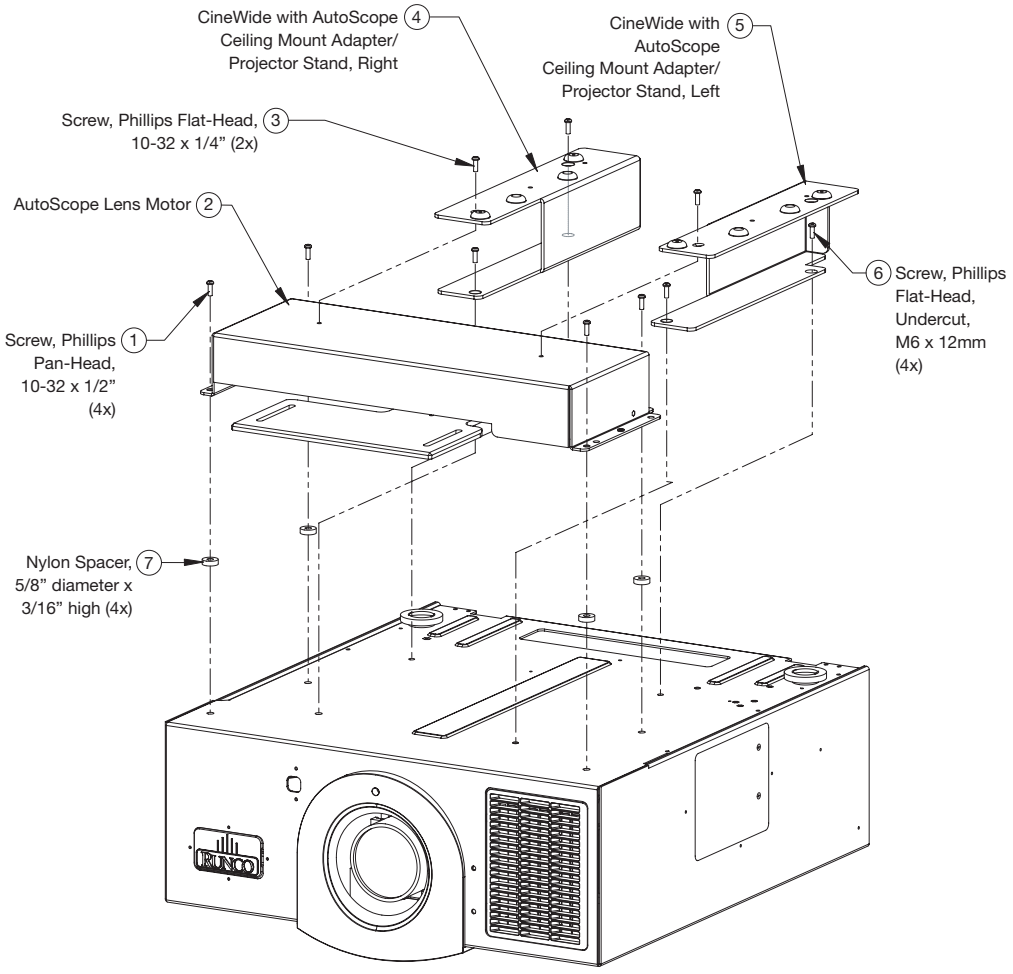
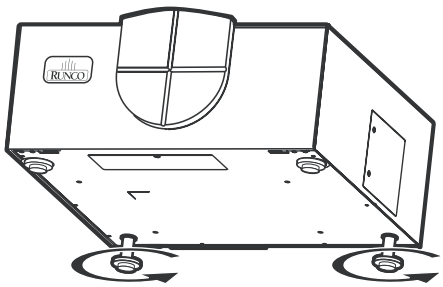


Figure 3-5. RS-900/CineWide with AutoScope Motor Assembly – Exploded View

Remove Projector Front Height Adjusters:

Place the projector upside down on a blanket or other soft surface. Then, remove the two height adjusters at the front of the projector by turning them counterclockwise until they come out.



Install Ceiling Mount Adapters/Projector Stands: For ceiling installations, these brackets bring the mounting points for the projector mounting rails (included with the projector ceiling mount kit) from the bottom of the projector up and around the AutoScope lens motor housing. For floor installations (where the projector is upright), the adapters allow the projector to lie flat on the mounting surface.

Using the four (4), supplied M6 x 12mm Flat-Head Phillips screws (item #6), attach the AutoScope Ceiling Mount Adapters/Projector Stands (items #4 and #5) to the projector as shown in Figure 3-6.

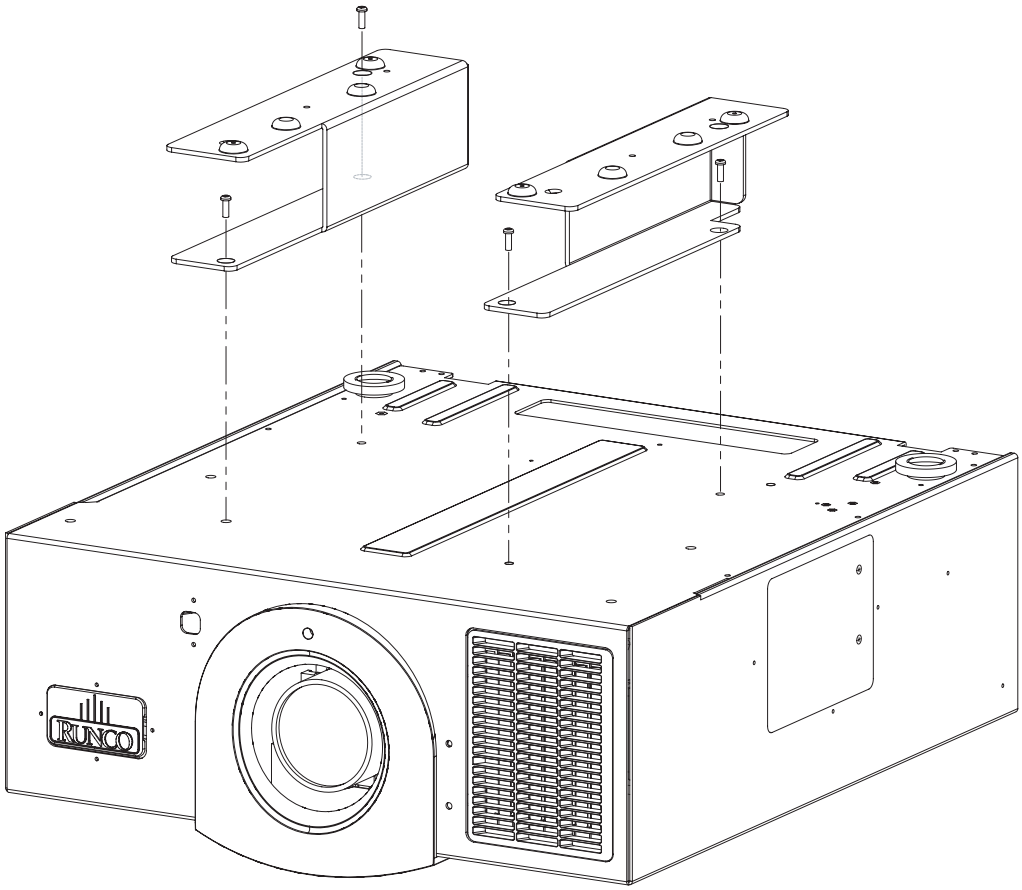


Figure 3-6. RS-900 with Ceiling Mount Adapters/Projector Stands

Caution *DO NOT OVER-TIGHTEN THE SCREWS.*

Install Lens Motor:

1. Position the AutoScope Lens Motor (item #2) as shown in Figure 3-7.
2. Line up the mounting holes on the lens motor housing with those on the underside of the projector.
3. Secure the motor to the projector with the four (4), supplied 10-32 x 1/2" Pan-Head Phillips screws (item #1) and nylon spacers (item #7).
4. Secure the AutoScope Ceiling Mount Adapters/Projector Stands to the motor using the two (2), supplied 10-32 x 1/4" Flat-Head Phillips screws (item #3).

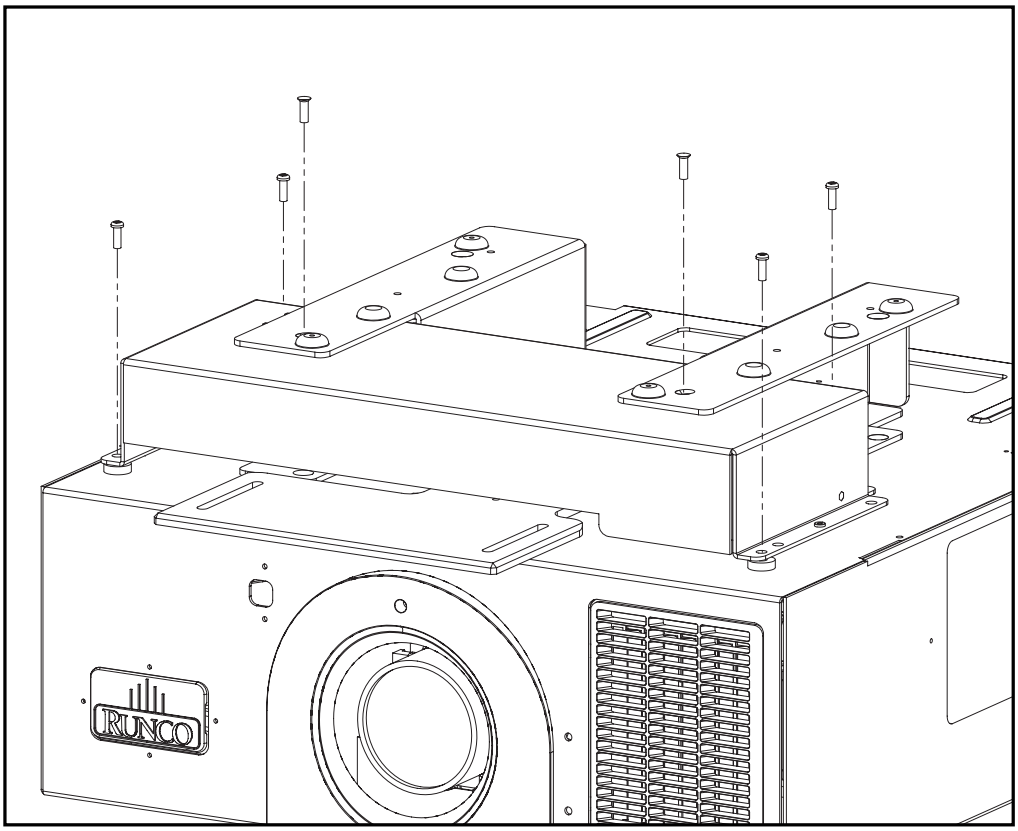


Figure 3-7. AutoScope Lens Motor Installation

After you have installed the AutoScope lens motor, proceed with ***Mounting the RS-900*** on page 28.

➤ *Installing the Fixed CineWide Base Plate (RS-900/CineWide, Prismatic Lens)*

To install the fixed CineWide base plate on a RS-900/CineWide with a **prismatic** anamorphic lens:

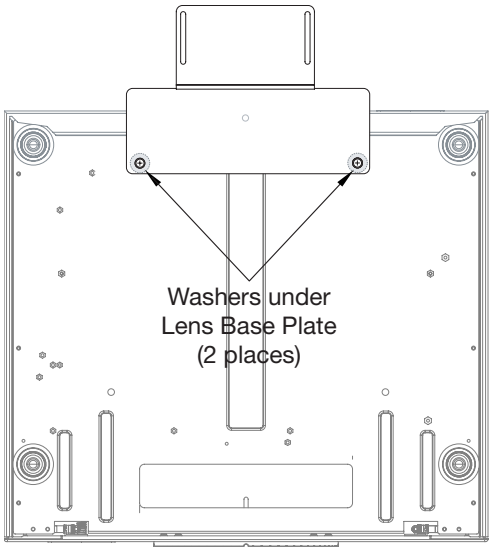
1. Place the projector upside down on a blanket or other soft surface.
2. **If you are mounting the RS-900/CineWide on a ceiling:** Line up the four holes on the projector ceiling mounting plate (included with the projector ceiling mount kit) with those on the bottom of the projector.
3. Line up the two mounting holes on the CineWide base plate with those on the bottom of the projector (and at the front of the ceiling mount plate, if present).
4. Secure the CineWide base plate (and ceiling mounting plate, if needed) to the projector with the M6x12mm screws and washers provided with the CineWide lens base plate. See Figure 3-8.

Caution

1. Do not use the mounting screws provided with the ceiling mounting plate. Use only the hardware provided with the CineWide lens base plate.

2. DO NOT OVER-TIGHTEN THE SCREWS.

RS-900/CineWide with Lens Base Plate



RS-900/CineWide with Lens Base Plate and Ceiling Mounting Plate

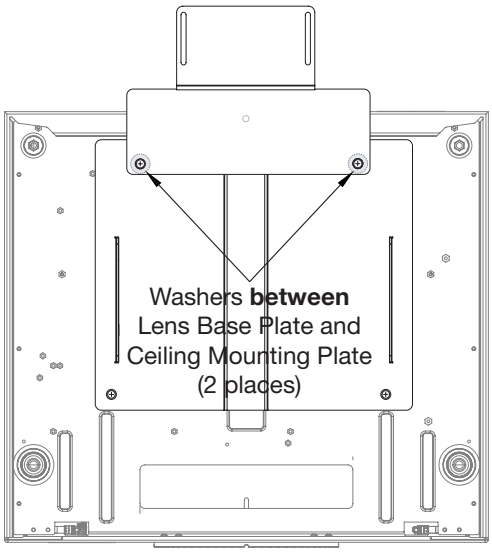


Figure 3-8. RS-900/CineWide with Whitney (Prismatic) Lens Base Plate and Ceiling Mounting Plate - Bottom View

Installing the Fixed CineWide Base Plate (RS-900/CineWide, Cylindrical Lens)

➤ Figure 3-9 shows the RS-900/CineWide cylindrical (Rainier II/McKinley) lens base plate assembly.

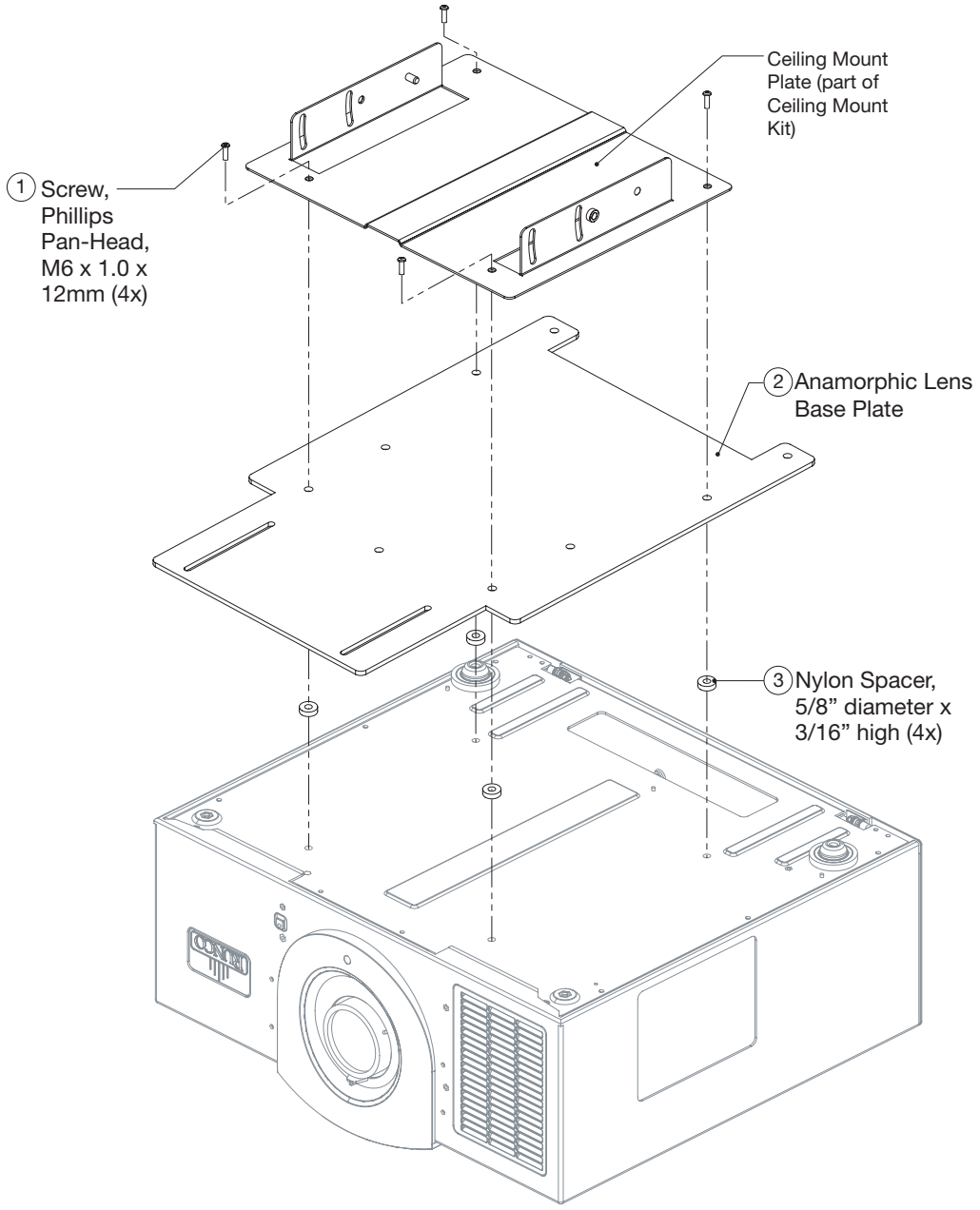


Figure 3-9. RS-900/CineWide with Rainier II/McKinley (Cylindrical) Lens Base Plate and Ceiling Mounting Plate - Exploded View

1. Place the projector upside down on a blanket or other soft surface.
2. Install a nylon spacer (item #3) at each mounting hole location.
3. Line up the four mounting holes on the CineWide base plate (item #2) with those on the bottom of the projector.
4. **If you are mounting the RS-900/CineWide on a ceiling:** Line up the four holes on the projector ceiling mounting plate (included with the projector ceiling mount kit) with those on the bottom of the projector.

Note

The hole pattern on the CineWide base plate is identical to that on the ceiling mounting plate.

5. Secure the CineWide base plate (and ceiling mounting plate, if needed) to the projector with the M6x12mm screws (item #1) and nylon spacers provided with the CineWide lens base plate.

Caution

1. Do not use the mounting screws provided with the ceiling mounting plate. Use only the hardware provided with the CineWide lens base plate.

2. DO NOT OVER-TIGHTEN THE SCREWS.

3.5 Mounting the RS-900

There are several methods for mounting the projector. Depending on your chosen installation, one method may be more suitable than another.

Floor Mounting (Upright) ➤

In typical front and rear screen installations, the projector can be mounted to a secure and level surface such as a table or cart. Carts are useful when moving a projector during a presentation or from site to site. If possible, lock the wheels when it's in position to prevent it from being moved during a presentation.

Ceiling Mounting (Inverted) ➤

For fixed installations, and for those that want the projector out of sight or have a limited space for projector and audience, you can invert the RS-900 and suspend it from the ceiling using a specially-designed ceiling mount fixture.

Note

Use only the Runco-approved ceiling mount kit designed for your projector. Install the mount kit according to the instructions provided with it.

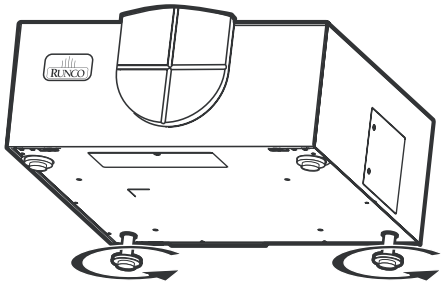
The projector can also be inverted and placed in an enclosure above and behind the viewing area. Install four feet on the inside bottom surface of the enclosure on which the projector can rest. A variety of materials can be used for this purpose (for example, rubber crutch tips or turntable feet).

Adjusting the Projector Height or Projection Angle ➤

If the screen is significantly higher or lower than the projector, you can also tilt the projector at a slight angle. In a ceiling installation, you do this by adjusting the ceiling mount.

For a floor installation, turn the four adjustable feet on the bottom of the projector to adjust the projector height and/or projection angle.

If you do this, you may need to make keystone adjustments or vertically shift the image using the on-screen display (OSD) controls, to compensate. For detailed instructions, refer to ***Using the On-Screen Menus*** on page 46.



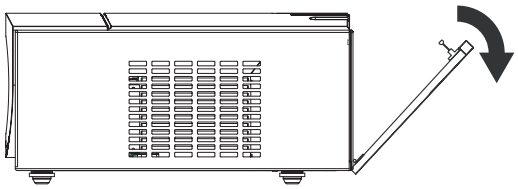
3.6 Connections to the RS-900

Proceed as follows to connect the RS-900 to your video sources, external controller(s) – if present – and AC power.

When connecting your equipment:

- Turn off all equipment before making any connections.
- Use the correct signal cables for each source.
- Ensure that the cables are securely connected. Tighten the thumbscrews on connectors that have them.

To access the connector panel, pull firmly on the cable access cover to open it.



➤ ***Connector Panel Access***

Connect your video sources to the RS-900 as shown and described in the sections that follow.

➤ ***Connecting Source Components to the RS-900***

HDMI/DVI Connections: See Figure 3-10. With an HDMI source, use the included HDMI-to-HDMI cable; with a DVI source, use the included DVI-to-HDMI cable.

Use the HDMI input whenever possible. This ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output into the projector.

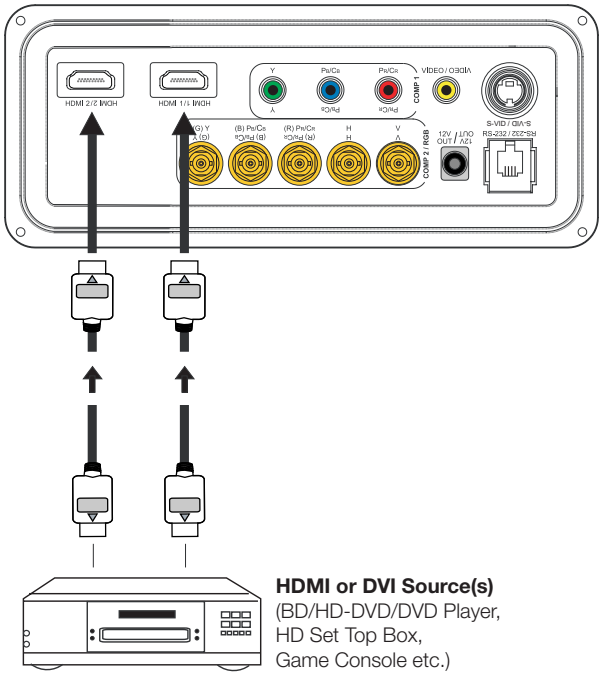


Figure 3-10. HDMI/DVI Source Connections

RGB Connections: Connect your personal computer or other RGB source (DVD player or HD set top box) to the **COMP 2/RGB** input; see Figure 3-11. You can use the included DB15HD-to-5 x BNC cable if your RGB source has a 15-pin, VGA-type connector.

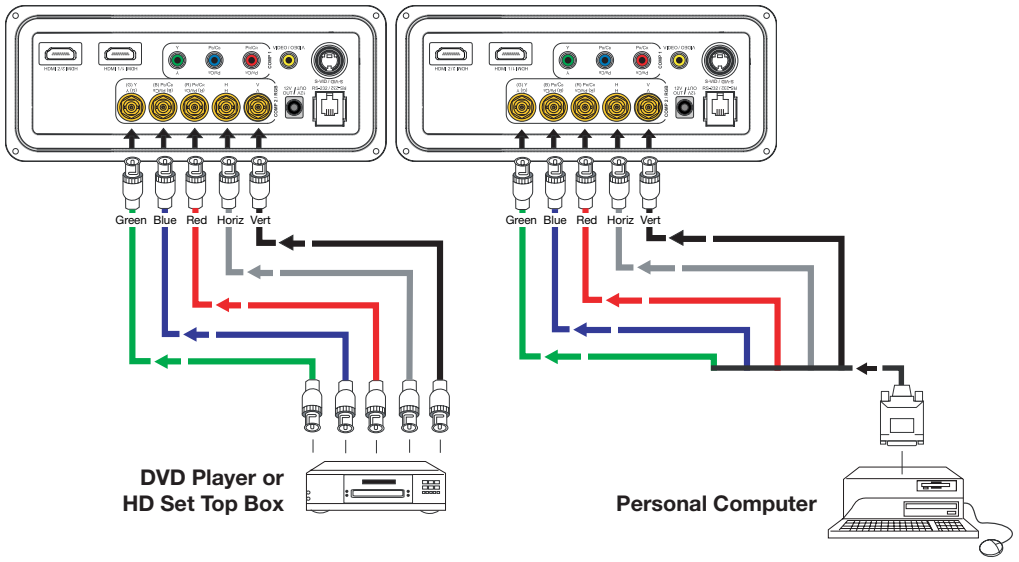


Figure 3-11. RGB Connections

Progressive Component Video Connections: Connect your progressive component source (DVD player or HD set top box) to the **COMP 2/RGB** input as shown in Figure 3-12.

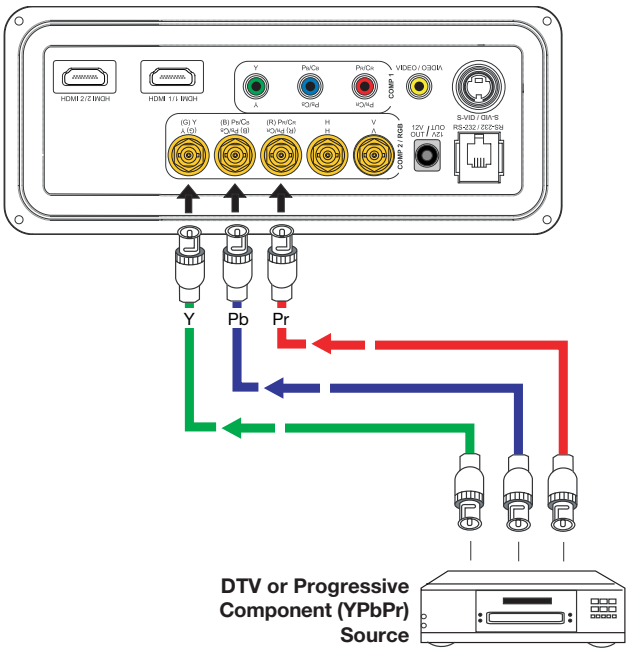


Figure 3-12. Progressive Component Video Connections

Composite/S-Video/Component Video Connections: Use the included cables to connect your composite, S-Video and component video sources to the RS-900 as shown in Figure 3-13.

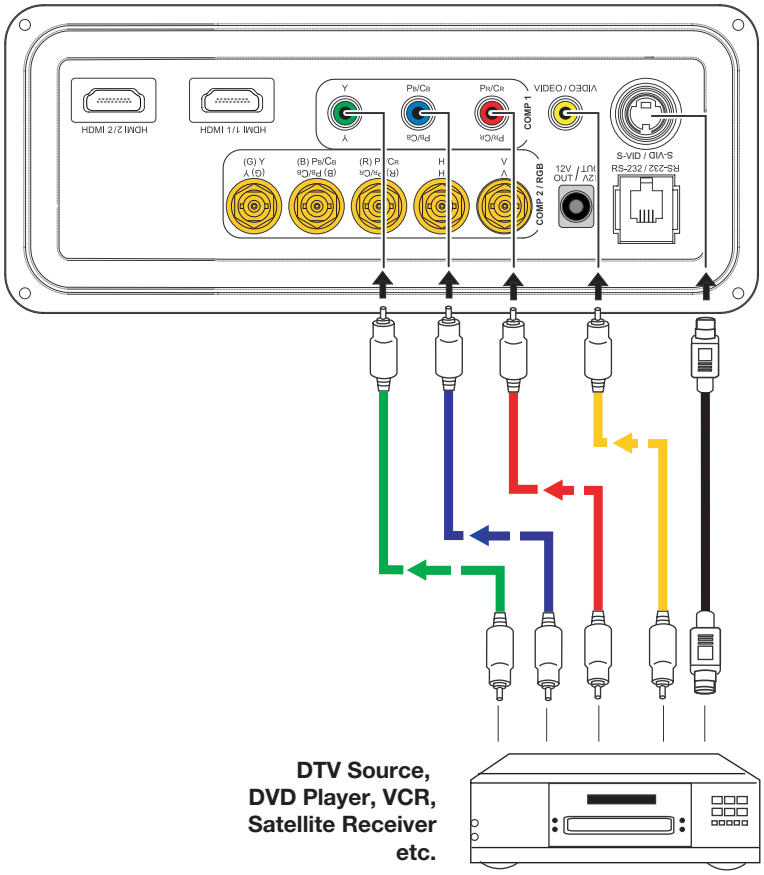
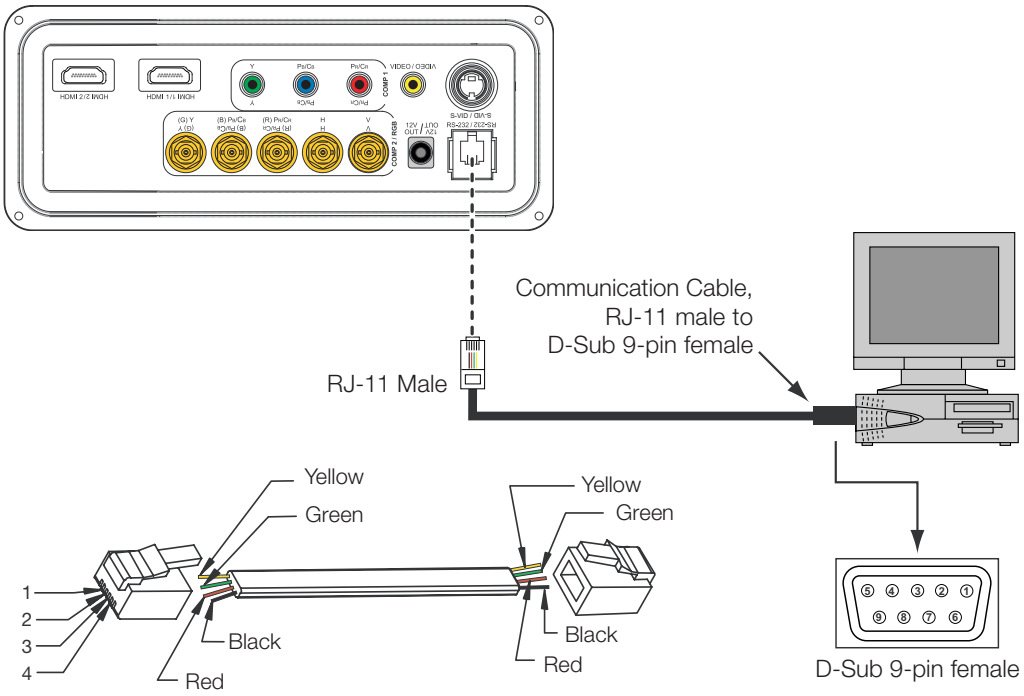


Figure 3-13. Composite, S-Video and Component Video Connections

RS-232 Controller Connection ➤

Use the communication cable supplied with the projector to connect a PC or home theater control/automation system (if present) to the RS-232 port on the RS-900; see Figure 3-14.

For more information about using this connection, refer to ***Serial Communications*** on page 69.



RS-232 Adapter Wiring		
D-Sub 9-pin female	**4-pin RJ-11**	**Function**
2	2	Transmit Data
3	3	Receive Data
5	1, 4	Ground
1, 4, 6, 7, 8, 9	--	Not Connected

Figure 3-14. RS-232 Control System Connection

If you are installing an RS-900/CineWide with AutoScope, use the cable supplied with the AutoScope Lens Motor to connect the motor to the 12-volt trigger output as shown in Figure 3-15.

➤ *Connecting 12-Volt Trigger Output to External Theater Equipment*

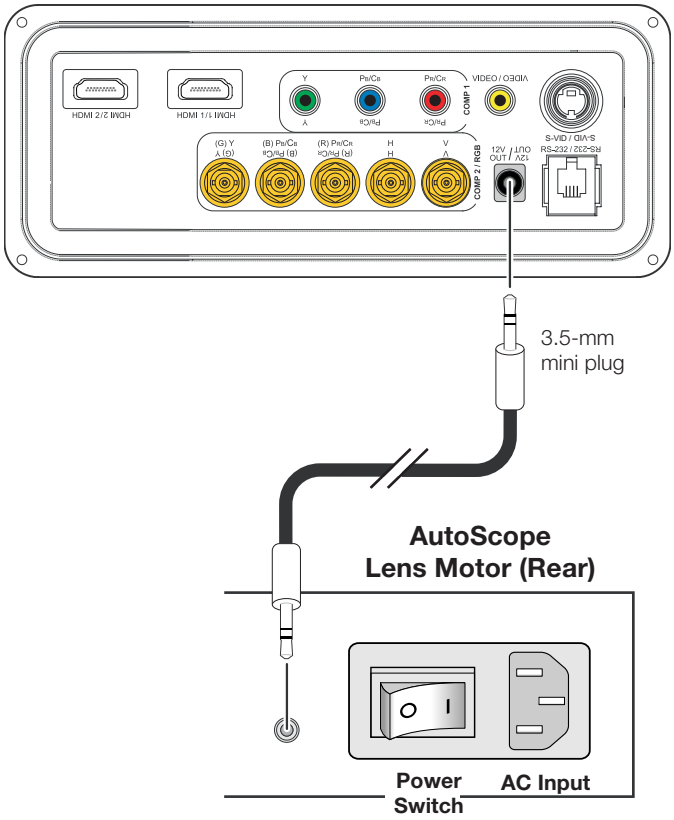


Figure 3-15. Connecting the 12-Volt Trigger Output to the AutoScope Lens Motor

If your home theater contains a retractable screen, screen mask or other 12-volt trigger-activated equipment, connect it to the 12-volt trigger output as shown in Figure 3-16.

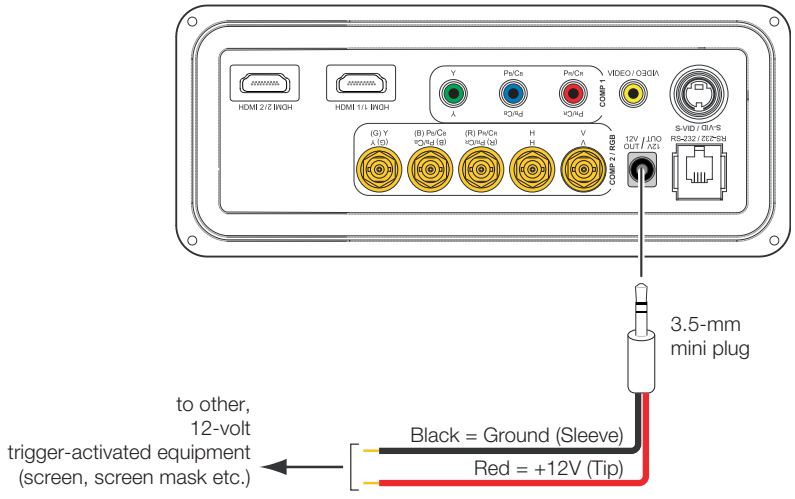
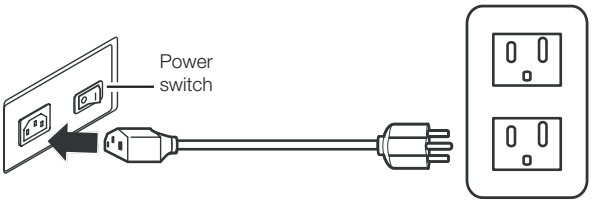


Figure 3-16. Connecting the 12-Volt Trigger Output to Other Equipment

Connecting to AC Power ➤

Projector: The RS-900 ships with various types of AC power cords. Choose the one that is appropriate to your locale.

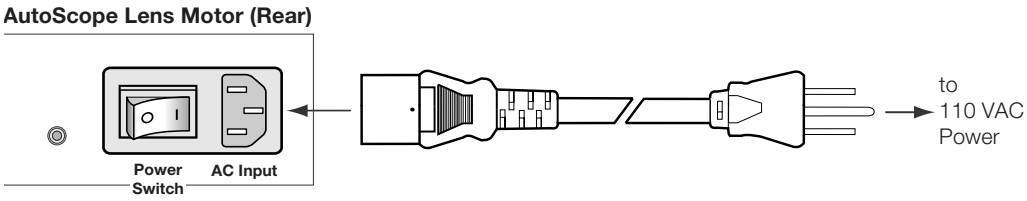
Plug the female end of the power cord into the AC receptacle on the rear of the projector (AC 100V ~ 240V). Then, connect the other end to your AC power source.



AutoScope Lens Motor: With AutoScope-equipped projectors, an additional power cord is provided for the lens motor. Plug the female end of the AC power cord into the AC input on the rear of the lens motor assembly. Connect the other end to a 110 VAC power source.

Caution

The input voltage to the AutoScope lens motor must be between 100 and 120 VAC. ***Do not connect the AutoScope lens motor to a 200-240 VAC power source!***



3.7 Turning on the Power

1. Turn on your source components.
2. If this is an AutoScope-equipped projector, turn on the main power switch at the rear of the AutoScope lens motor. The lens motor power switch is located next to the AC input (see above).
3. Turn on the main power switch at the rear of the projector. The POWER LED lights orange. The LAMP and TEMP LEDs light red briefly, then go out.
4. Press the **ON** button on the remote control to turn on the RS-900. The POWER LED flashes green to indicate that it is warming up.
5. When the projector is ready for use, the POWER LED lights solid green.
6. "[Input Name] Source Searching" appears on the screen before the RS-900 identifies the input signal and remains there until a valid signal is detected.

3.8 Changing the OSD Language

The RS-900 OSD language is initially set to English, but can also display the menus in French, Spanish, Italian or German. To change the OSD language:

1. Press **MENU**.
2. Select **Installation** from the Main Menu and press **ENTER**.
3. Select **Language** from the Installation Menu and press **ENTER**.
4. Press ▲ or ▼ to highlight the desired language. (The change takes effect immediately.)

3.9 Adjusting the Picture Orientation

By default, the RS-900 is configured for a “floor/front” installation, in which the projector is installed upright and in front of the screen. If it is installed behind the screen and/or mounted on a ceiling, you must change the picture orientation. To do this:

1. Press **MENU** on the remote control.
2. Select Installation from the Main Menu and press **ENTER**.
3. Select Picture Orientation from the Installation Menu and press **ENTER**.
4. Choose Floor Rear, Ceiling Front or Ceiling Rear to match the installation method.

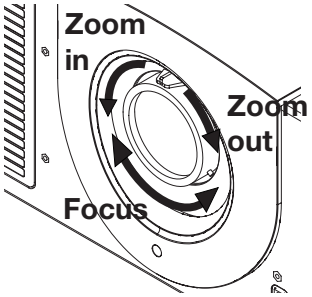
3.10 Primary Lens Adjustments

The RS-900 gives you a great deal of control over the picture size, position and focus.

To focus the projected image, grasp the lens by the outer ring and rotate it.

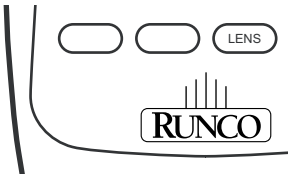
To make the picture smaller (zoom out) or larger (zoom in), move the zoom tab in the appropriate direction.

◄ ***Focus and Zoom***



To shift the projected image vertically, press the **LENS** button, then press and hold the up or down-arrow **(▲, ▼)** button.

◄ ***Vertical Lens Shift***



3.11 Installing and Adjusting the CineWide Anamorphic Lens

If you are installing a CineWide-equipped projector, proceed as follows to install and adjust the anamorphic lens.

Note

It is extremely important that the primary lens is properly adjusted before you install the anamorphic lens. Ensure that the image from the primary lens is perfectly centered on the screen.

Runco offers two types of anamorphic lenses for its CineWide projectors: ***prismatic*** and ***cylindrical***.

- The prismatic lens compresses the height of the image (as opposed to stretching the width) to achieve a 2.35:1 aspect ratio with a 1.78:1 display device.
- The cylindrical anamorphic lens has a larger aperture than the prismatic lens. It stretches the width of the image to achieve a 2.35:1 aspect ratio with a 1.78:1 display device. Two, cylindrical anamorphic lens options are available: Rainier II and McKinley. Although they differ in size and throw distance range (refer to Table 3-3), the installation procedure for both lenses is similar.

The RS-900/CineWide is available with either a prismatic or a cylindrical anamorphic lens; the RS-900/CineWide with AutoScope always uses a cylindrical lens.

If you are installing an RS-900/CineWide with a prismatic lens, refer to ***Anamorphic Lens Installation and Adjustment - RS-900/CineWide (Whitney Lens)*** on page 42. If you are installing an RS-900/CineWide with a cylindrical lens or an RS-900/CineWide with AutoScope, continue with the next section.

The RS-900 Anamorphic lens mount kit consists of everything shown in Figure 3-17. Some components shipped with your projector may differ slightly from what is shown in these instructions.

◄ ***Anamorphic Lens Installation and Adjustment - RS-900/CineWide with AutoScope or RS-900/CineWide (McKinley or Rainier II Lens)***

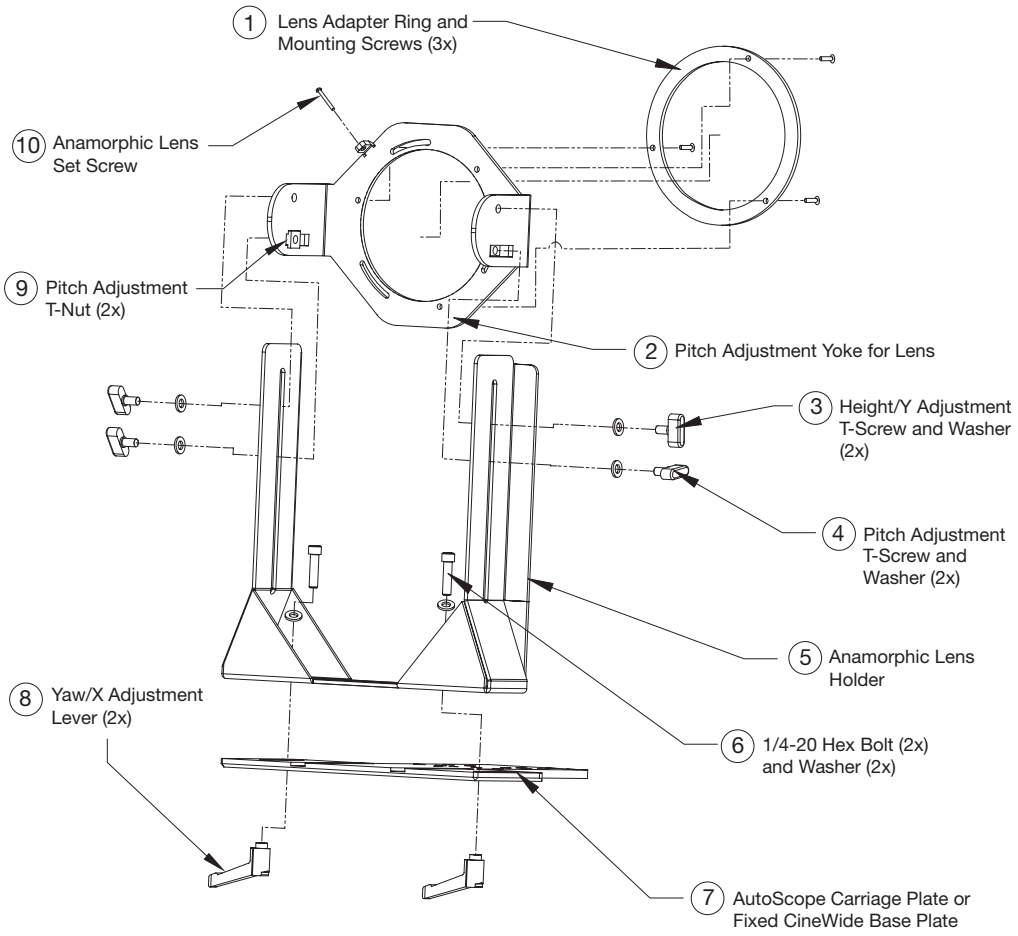


Figure 3-17. RS-900 Anamorphic Lens Mounting Assembly - Exploded View

Attaching Lens Mounting Assembly to Lens Motor Carriage Plate or Fixed CineWide Base Plate:

1. Remove the two Yaw/X Adjustment Levers (item #8) from the bottom of the Anamorphic Lens Holder (item #5).
2. Place the Anamorphic Lens Holder on top of the AutoScope Carriage Plate or Fixed CineWide Base Plate (item #7). Position the bracket so that the long slot at the bottom of the lens holder is perpendicular to the corresponding slots on the plate.
3. Secure the Anamorphic Lens Holder to the plate using the Hex Bolts/Washers (item #6) and Yaw/X Adjustment Levers that you removed in Step 1.
4. Use the Lens Mounting Screws to attach the Lens Adapter Ring (item #1) to the Pitch Adjustment Yoke (item #2); see Figure 3-18. (Use the round, threaded holes on the yoke.)
5. Use the Height/Y Adjustment T-Screws/Washers (item #3), Pitch Adjustment T-Screws/Washers (item #4) and T-Nuts (item #9) to attach the Pitch Adjustment

Yoke and Lens Adapter Ring to the Anamorphic Lens Holder. **The Yoke should be as close to the primary lens as possible.**

6. Attach the lens to the Lens Adapter Ring by threading it clockwise.

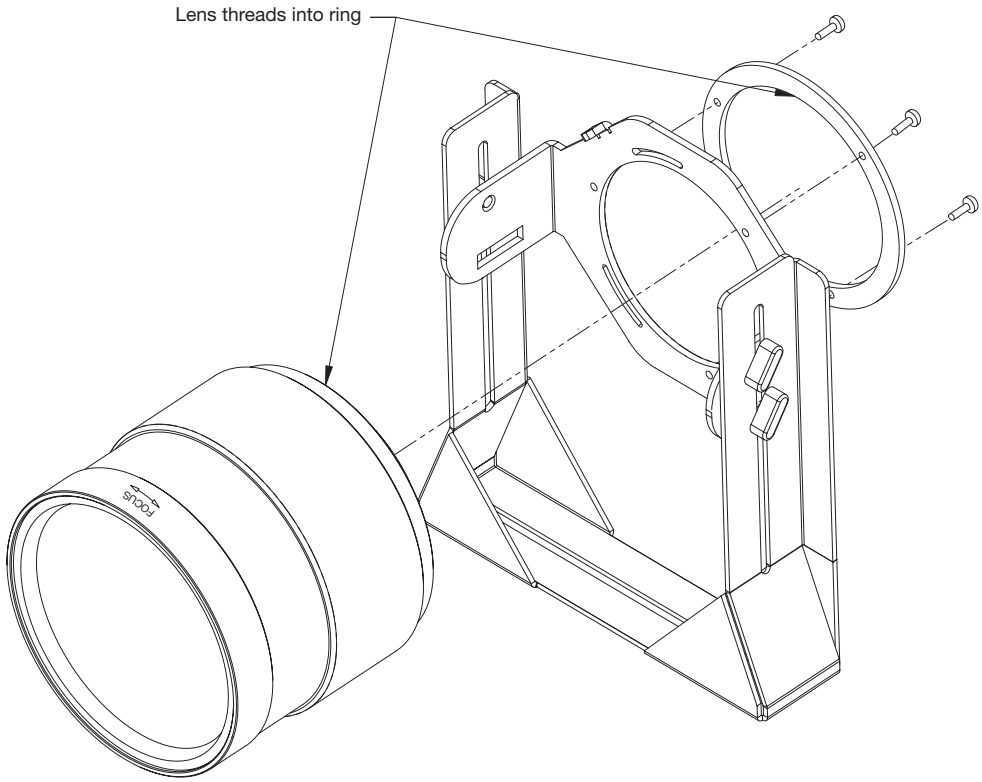


Figure 3-18. Attaching the Anamorphic Lens to the Lens Ring

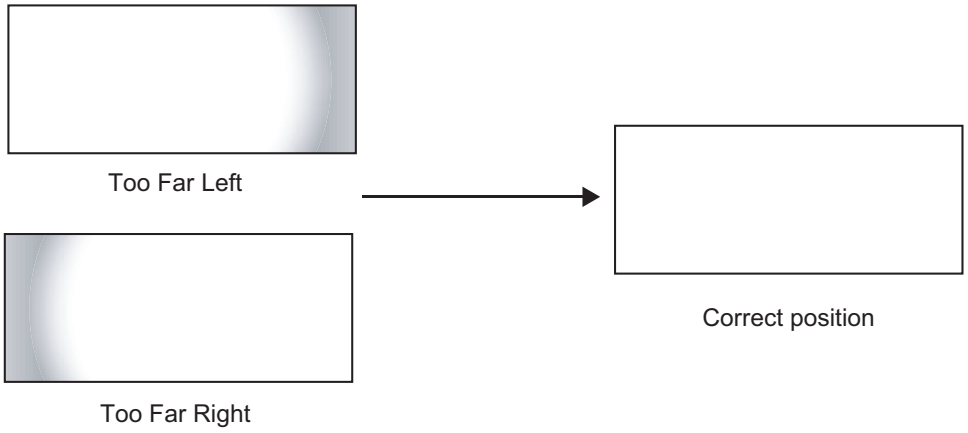
Configure Lens Motor Trigger: CineWide with AutoScope maintains constant image height independent of the aspect ratio, while using the full display resolution of the projector. It accomplishes this by moving the anamorphic lens in front of the primary lens when widescreen material is being viewed. When the viewer transitions back to 16:9 or 4:3 source material, the anamorphic lens moves out of the light path.

To configure the lens motor trigger on the RS-900 for proper AutoScope operation:

1. Press **MENU** on the remote control.
2. Select Setup from the Main menu and press **ENTER**.
3. Use the number buttons on the remote to enter the Setup menu passcode when prompted and press **ENTER** again. Then, press **MENU** on the remote control.
4. Select 12-volt Trigger from the Setup menu.
5. Set the 12-volt Trigger to “Cinema.” This enables the lens motor to move the anamorphic lens into position (in front of the primary lens) when the Cinema or Virtual Cinema aspect ratio is selected.
6. Select the Cinema or Virtual Cinema aspect ratio to move the anamorphic lens into position, if it isn’t already. To do this, press **CINEMA** or **VCINE** on the RS-900 remote control (Figure 2-4).

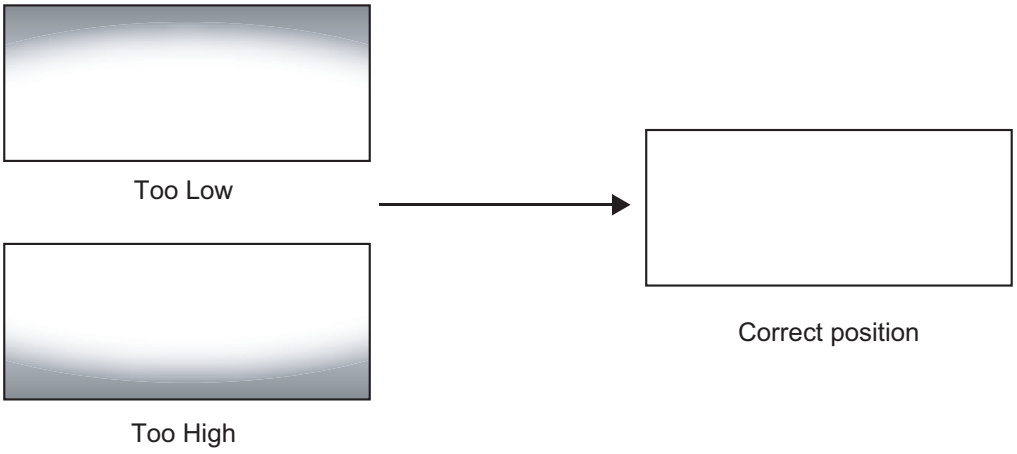
Adjusting the Horizontal (X) Lens Position:

1. Project a white field on the screen.
2. Loosen the Yaw/X-Adjustment Levers underneath the lens.
3. Slowly move the anamorphic lens into place (from right to left or vice versa) so that there are no shadows on either side of the screen:



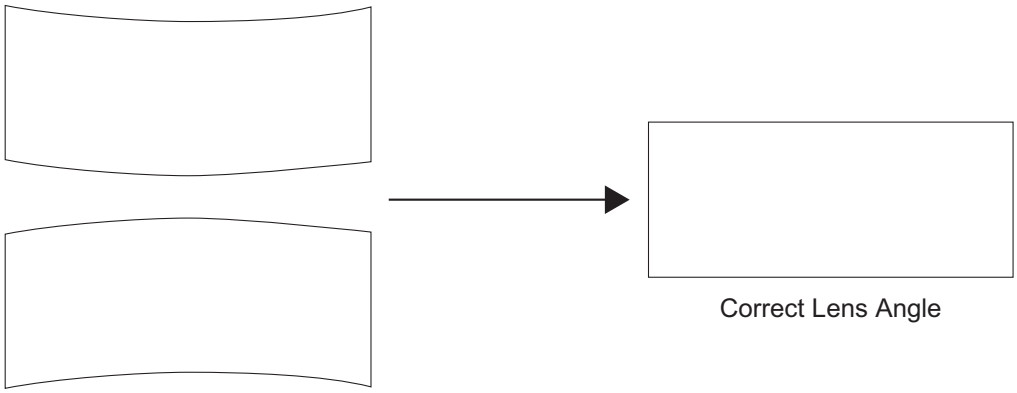
4. When the horizontal position is properly set, tighten the Yaw/X-Adjustment Levers to secure the lens in place.

Adjusting the Height (Y): With the white field still on-screen, loosen the Height/Y Adjustment T-Screws on either side of the lens. Then, slowly move the anamorphic lens into place so that there are no shadows on the top or bottom of the screen:



When the height is properly set, tighten the Height Adjustment T-Screws to secure the lens in place.

Adjusting the Pitch (Angle): Next, angle the lens to even out any top-to-bottom pincushion distortion. To do this, loosen the Pitch Adjustment T-Screws (directly below the Height/Y Adjustment T-Screws) on either side of the lens to allow it to pivot freely. Then, adjust the anamorphic lens angle so that the projected image is rectangular:



Correct Lens Angle

Incorrect Lens Angle

The anamorphic lens will almost always be angled with respect to the projector; this is normal.

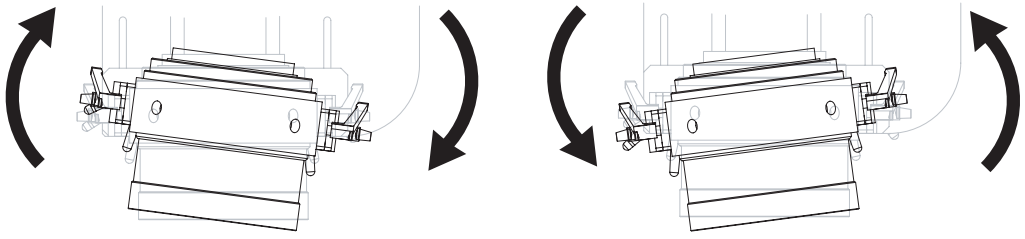
Once the proper lens angle has been set, firmly tighten the Pitch Adjustment T-Screws to secure the lens in place.

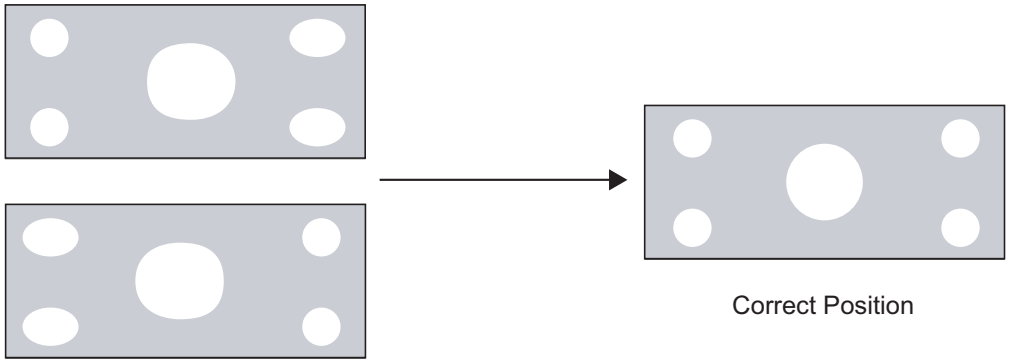
Note

There may be some pincushion distortion even after the lens is properly adjusted, especially at shorter throw distances. If this is the case, Runco recommends that you slightly over-scan the image into the screen frame area to mask the distortion.

Adjusting the Yaw: Loosen the Yaw/X-Adjustment Levers to allow the lens to pivot freely from side to side. Then, angle the lens to even out any left-right pincushion distortion:

Anamorphic Lens (Top View)





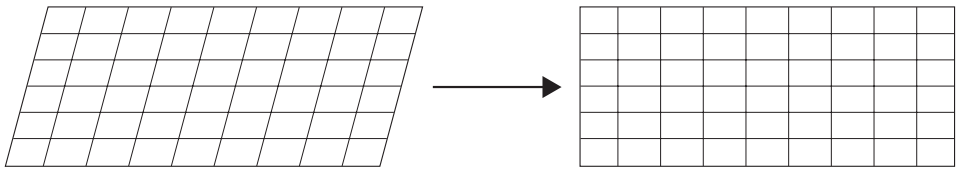
Correct Position

Wrong Position

Once the proper lens angle has been set, firmly tighten the Yaw/X-Adjustment Levers to secure the lens in place.

Geometry:

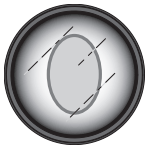
1. Input an anamorphic cross-hatch test pattern to the projector.
2. Unscrew the Anamorphic Lens just enough to allow it to rotate freely.
3. Grasp the lens by the center ring and rotate the lens until the image is properly anamorphic:



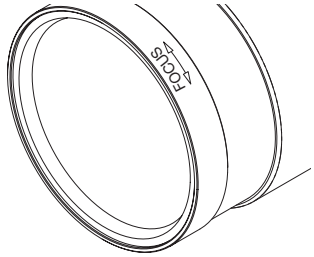
Wrong Position

Correct Position

4. When the image geometry appears correct, tighten the Anamorphic Lens Set Screw (item #10) to secure the lens in place. (When viewed from the front, the rear opening on the anamorphic lens should appear as a tall, narrow oval.)



Focus: Finally, rotate the Focus Ring on the anamorphic lens to fine-tune the optical focus.



Anamorphic Lens Installation and Adjustment - RS-900/CineWide (Whitney Lens)

The RS-900/CineWide – Whitney lens mount kit consists of everything shown in Figure 3-19. Some components shipped with your projector may differ slightly from what is shown in these instructions.

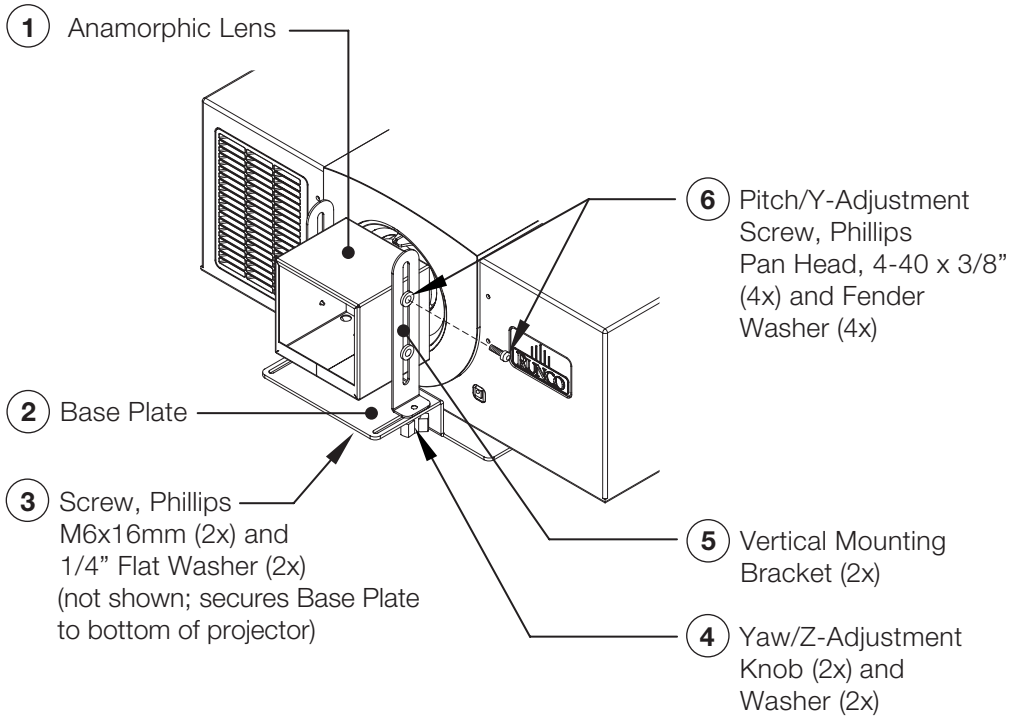
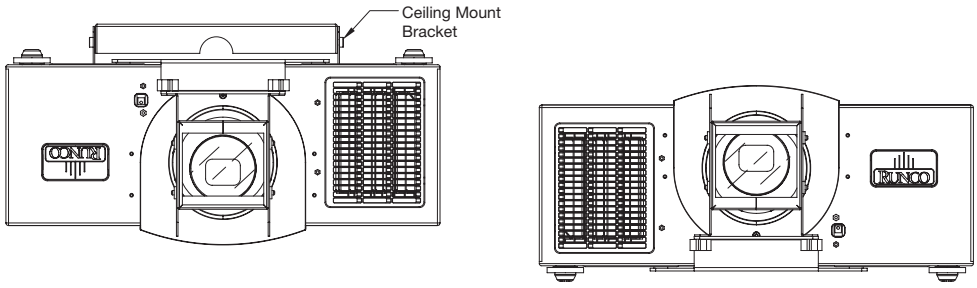


Figure 3-19. Standard RS-900 Anamorphic Lens Mounting Assembly - Exploded View

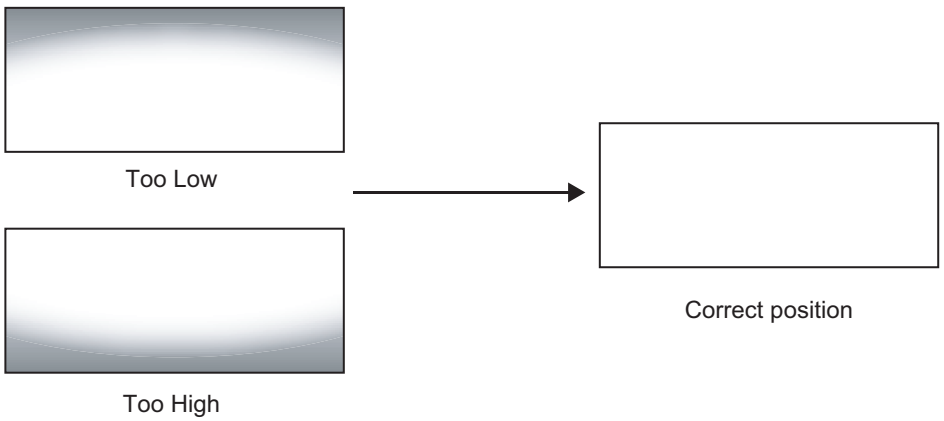
1. Use the Pitch Adjustment Screws and Washers (item #6) to attach the Vertical Mounting Brackets (item #5) to the Anamorphic Lens (item #1).
2. Place the lens with the brackets installed on top of (or under, if the projector is inverted) the Base Plate (item #2), so that the two threaded posts at the bottom of the brackets pass through the corresponding slots on the base plate.
3. Secure the lens assembly to the base plate with the Yaw/Z-Adjustment Knobs and Washers (item #4).

To avoid clipping the corners of the image, position the anamorphic lens as close as possible to the primary lens.



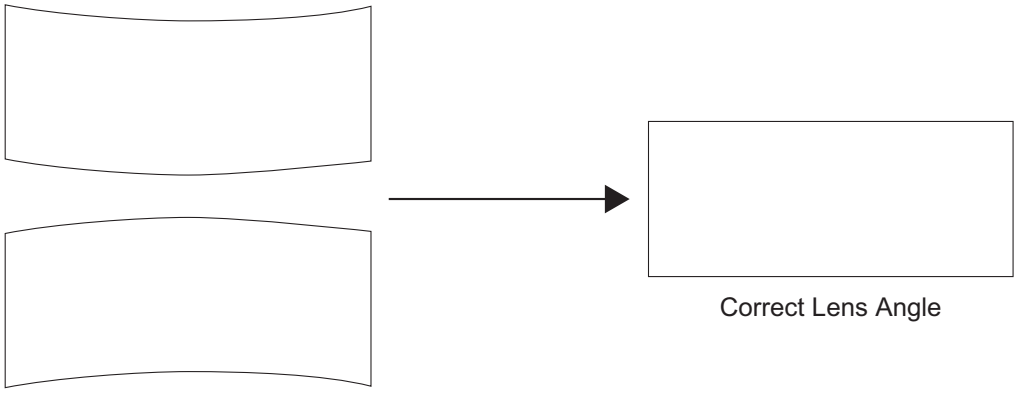
Adjusting the Lens Height (Y):

1. Project a white field on the screen.
2. Ensure that the four Height (Y) Adjustment Screws are loose enough to allow vertical movement of the lens assembly.
3. Slowly move the anamorphic lens into place so that there are no shadows on the top or bottom of the screen:



4. When the height is properly set, tighten the Height Adjustment Screws to secure the lens in place.

Adjusting the Pitch (Angle): Next, angle the lens to even out any top-to-bottom pincushion distortion. To do this, loosen the Pitch Adjustment Screws on either side of the lens to allow it to pivot freely. Then, adjust the anamorphic lens angle so that the projected image is rectangular:



Incorrect Lens Angle

Correct Lens Angle

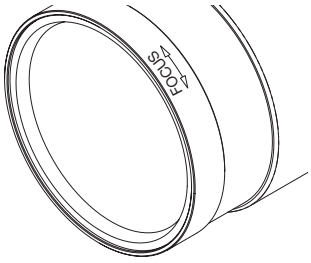
The anamorphic lens will almost always be angled with respect to the projector; this is normal.

Once the proper lens angle has been set, firmly tighten the Pitch Adjustment Screws to secure the lens in place.

Note

There may be some pincushion distortion even after the lens is properly adjusted, especially at shorter throw distances. If this is the case, Runco recommends that you slightly over-scan the image into the screen frame area to mask the distortion.

Finally, rotate the Focus Ring on the anamorphic lens to fine-tune the optical focus.



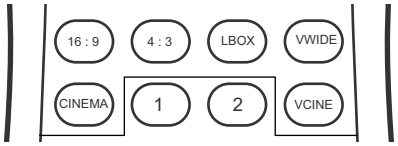
4. Operation

4.1 Selecting Video Memory

- Press the **CUST1** or **CUST2** button on the remote control to recall settings for the current input from the “Custom 1” or “Custom 2” memory preset.
- Press **ISF NIGHT** to recall settings for the current input from the “ISF Night” memory preset.
- Press **ISF DAY** to recall settings for the current input from the “ISF Day” memory preset.

4.2 Selecting an Aspect Ratio

Use these buttons to select the appropriate aspect ratio for the type of program material being viewed. For more information on aspect ratios, refer to Table 4-1.



4.3 Adjusting the Picture

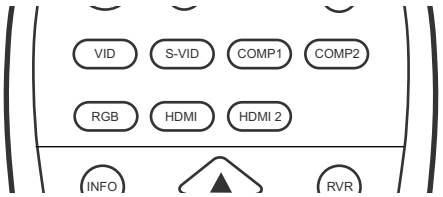
- Press the **BRT** button on the remote control to adjust the image brightness.
- Press **CONT** to adjust the image contrast.
- Press **COL** to adjust the image color level.
- Press **TINT** to adjust the hue of the image.

For more information about these controls, refer to ***Picture Adjust*** on page 48.

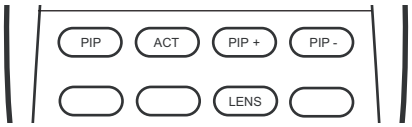
4.4 Selecting An Input Source

When you turn on the RS-900, it switches to the last selected input and looks for a valid signal.

Use these buttons on the remote control to select an input source directly.



4.5 Using Picture-In-Picture (PIP)



For PIP purposes, there are two groups of inputs separated by their display modes:

- **Video (SD) group:** Video and S-Video inputs.
- **Graphic (HD) group:** HDMI 1, HDMI 2, Component 1 and Component 2/RGB inputs.

PIP shows one input from the Graphic group within one input from the Video group, or vice versa.

- Press **PIP** to enable the PIP function. Press **PIP** again to turn PIP off.
- To adjust the size of the PIP window, press **PIP+** or **PIP-**.
- When PIP is active, press **ACT** (Active) to display the Main and Secondary source menu.

  To select a main window input source, press ▲ or ▼ to highlight it and press **ENTER**. Then, do the same for the secondary window input source using the ▶, ▲, ▼ and **ENTER** buttons. When finished, press **EXIT**.

PIP		
	Main	Secondary
>	Video	Video
	S-Video	S-Video
	Component 1	> Component 1
	Component 2	Component 2
	HDMI 1	HDMI 1
	HDMI 2	HDMI 2
	RGB HD	RGB HD

4.6 Using the On-Screen Menus

- Press the **MENU** button on the remote control to display the Main Menu. To select a menu item, use the ▲ and ▼ buttons on the remote control to highlight it. Press **ENTER** or ▶ to confirm your selection.
- Use the arrow buttons to select menu items or change settings.
- Press **EXIT** to return to the previous menu.
- Press **MENU** to turn off the OSD menu. (When the Main Menu is displayed, pressing **EXIT** also turns off the menu.)

The RS-900 OSD menus are arranged hierarchically, as shown in Figure 4-1. Depending on the selected input source and signal characteristics, some menu options may not be available.

Source Select	Video			
	S-Video			
	Component 1			
	Component 2			
	HDMI 1			
	HDMI 2			
	RGB HD			
Picture Adjust	Picture Memory	ISF Night, ISF Day, Custom 1 or Custom 2		
	Copy Settings			
	Brightness	0 ... 100		
	Contrast	0 ... 100		
	Color	0 ... 100		
	Tint	0 ... 100		
	Sharpness	0 ... 8		
	Color Temperature	5400 K, 6500 K, 9300 K, Custom 1 or Custom 2		
	Reset to Defaults			
Aspect Ratio	16:9			
	4:3			
	Letterbox			
	Virtual Wide			
	Cinema			
	Virtual Cinema	(available only on RS-900 projectors equipped with the CineWide option)		
Installation	Language	English, French, Spanish, German or Italian		
	Orientation	Floor Front, Floor Rear, Ceiling Front or Ceiling Rear		
	GeoCorrection	V. Keystone		
		H. Keystone		
		Pincushion		
	Overscan	0 ... 3		
	HD & RGB Adjust (480p and higher-res. signals only)	Auto		
		Frequency	0 ... 100	
		Phase	-15, -14 ... 0 ... +14, +15	
		H. Position	0 ... +30	
		V. Position		
	OSD Setup	OSD Timer	0, 3, 6, 9 ... 60 sec.	
		OSD Position	Horizontal	
			Vertical	
	Blue Image	On / Off		
	Sleep Timer	0, 30, 60, 90 ... 360 min.		
Information	Source	(read only)		
	Resolution			
	Aspect Ratio			
	Picture Memory			
	Lamp Hours			
	Serial			

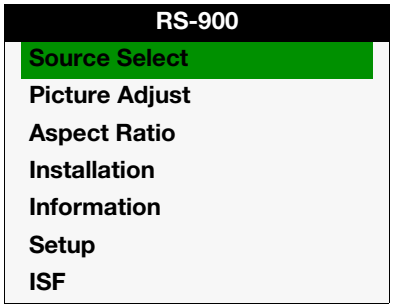
Setup	Lamp Power	170W or 200W	
	Lamp Hours	View / Reset	
	Fan Mode	Normal, Hi. Altitude or Manual	Speed (if Manual mode is selected)
	Background Color	Black, Blue or Gray	
	PIP	On / Off	
	RVR	0, 1, 2 ... 19	
	12-volt Trigger	Normal or Cinema	
	V. Correction	0 ... 3	
	Amplitude	Horizontal	0 ... 3
		Vertical	
	Auto Off	5, 10 ... 30 or Off	
	Default	Yes / No	
ISF	Picture Memory	ISF Night, ISF Day, Custom 1 or Custom 2	
	Copy Settings		
	Brightness	0 ... 100	
	Contrast	0 ... 100	
	Color	0 ... 100	
	Tint	0 ... 100	
	Sharpness	0 ... 8	
	Color Temperature	5400 K, 6500 K, 9300 K, Custom 1 or Custom 2	
	White Balance (available only when Custom 1 or Custom 2 color temp. is selected)	Gain	Red / Green / Blue
		Offset	
	Advanced Options	Image Enhance	DNR
			Detail Enhance
			Luma Enhance
			Chroma Enhance
		Black Threshold	0 IRE or 7.5 IRE
		Gamma Selection	2.8, 2.6, 2.5, 2.4 or 2.2
		Advanced Color Enhance (ACE)	R / G / B / Y / C / M Limit / Saturation
		Gamut	(refer to page 63)
	Reset to Defaults	Yes / No	

Figure 4-1. RS-900 OSD Menu Structure

Main Menu ➤

The Main Menu is the starting point for accessing all projector functions.

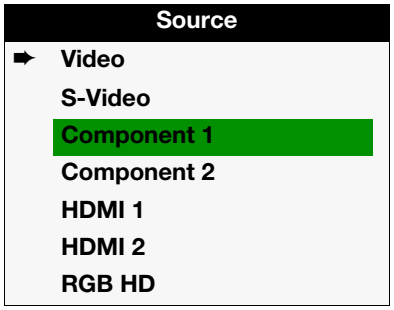
(The Set Up and ISF Calibration menus are hidden and not accessible until you enter a passcode.)



Source Select ➤

Choose Source Select from the Main Menu to switch video sources.

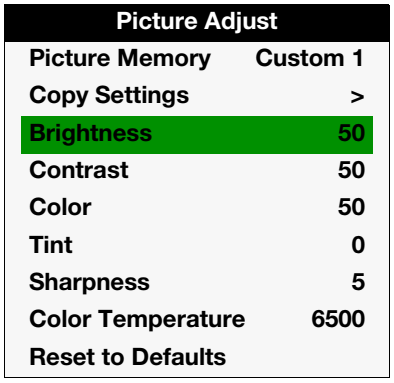
The active source is indicated by an arrow to its left; in this example, Video is the active source. To select a different source, use the ▲ or ▼ button to highlight it and press **ENTER**.



Picture Adjust ➤

Use the controls in the Picture Adjust menu to calibrate your RS-900 for optimum picture quality. To access the Picture Adjust menu, press **MENU**, highlight Picture Adjust and press **ENTER**.

To adjust a setting, use the ▲ or ▼ button to highlight it and press **ENTER**. Use the ◀ or ▶ button to change the setting. When finished, press **EXIT**.



The RS-900 has been designed to incorporate setup and calibration standards established by the Imaging Science Foundation (ISF). The ISF has developed carefully crafted, industry-recognized standards for optimal video performance and has implemented a training program for technicians and installers to use these standards to obtain optimal picture quality from Runco video display devices. Accordingly, Runco recommends that setup and calibration be performed by an ISF certified installation technician.

All signal types require separate processing. Therefore, you need to calibrate each input separately.

Although it may be possible to obtain satisfactory picture quality using the naked eye and regular program material, Runco recommends using the following calibration tools for best results:

- External test pattern source – Ovation Multimedia, Digital Video Essentials or AVIA test DVD or equivalent.
- A blue filter (provided with many test DVDs), for color level and tint adjustments.

Connect your test pattern source to the input that you are calibrating and proceed as follows. **Perform the adjustments in the order listed here.**

Picture Memory: For each input, the RS-900 lets you store picture quality settings as presets that you can recall at a later time. You can create up to four presets per input and resolution, to accommodate changing lighting conditions or viewer preferences.

To select a picture memory preset, highlight Picture Memory in the Picture Adjust menu and press ▶. Then, press ▲ or ▼ to select "Custom 1," "Custom 2," "ISF Night" or "ISF Day." When you select "Custom 1" or "Custom 2," any changes to picture quality settings are stored in the selected preset.

Note

*To store changes to the ISF Night or ISF Day Picture Memory preset, select that Picture Memory in the ISF menu (refer to **ISF** on page 61). **You must enter a passcode to access the ISF menu.***

Copy Settings: When you select the "Custom 1" or "Custom 2" Picture Memory preset, you can copy the settings from another preset to the selected preset. This gives you a convenient starting point for creating a new, custom preset. To do this, select Copy Settings from the Picture Adjust menu and choose "Custom 1," "Custom 2," "ISF Night" or "ISF Day."

Note

*To copy changes to the ISF Night or ISF Day Picture Memory preset, select that Picture Memory in the ISF menu (refer to **ISF** on page 61). **You must enter a passcode to access the ISF menu.***

Brightness: On your external test pattern source, select a PLUGE pattern. (PLUGE is an acronym for "Picture Line-Up Generation Equipment.") Figure 4-2 shows a typical PLUGE pattern.

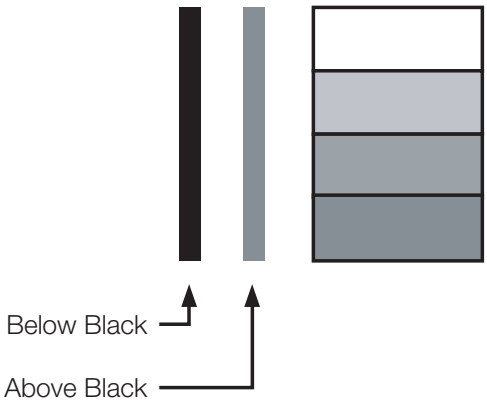


Figure 4-2. Typical PLUGE Pattern for Adjusting Brightness

PLUGE patterns vary but generally consist of some combination of black, white and gray areas against a black background. The example above includes two vertical bars and four shaded boxes.

Select Brightness from the Picture Adjust menu and press **ENTER**. Adjust the level so that:

- The darkest black bars disappear into the background.
- The dark gray areas are barely visible.
- The lighter gray areas are clearly visible.
- The white areas are a comfortable level of true white.
- The image contains only black, gray and white (no color).

Contrast: On your external test pattern source, select a stepped, gray-bar pattern like the one shown in Figure 4-3.

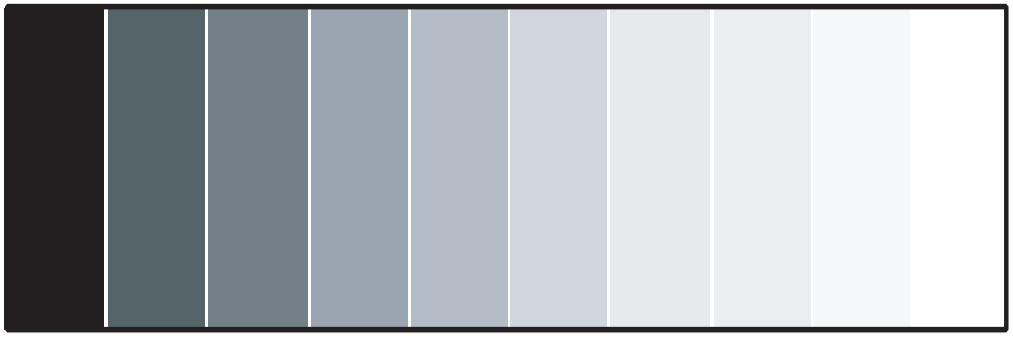


Figure 4-3. Typical Gray Bar Pattern for Adjusting Contrast

Select Contrast from the Picture Adjust menu and press **ENTER**. Adjust the contrast to a point just below which the white rectangle starts to increase in size.

Note

Brightness and Contrast controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Color: On your external test pattern source, select a color bar pattern like the one shown in Figure 4-4.

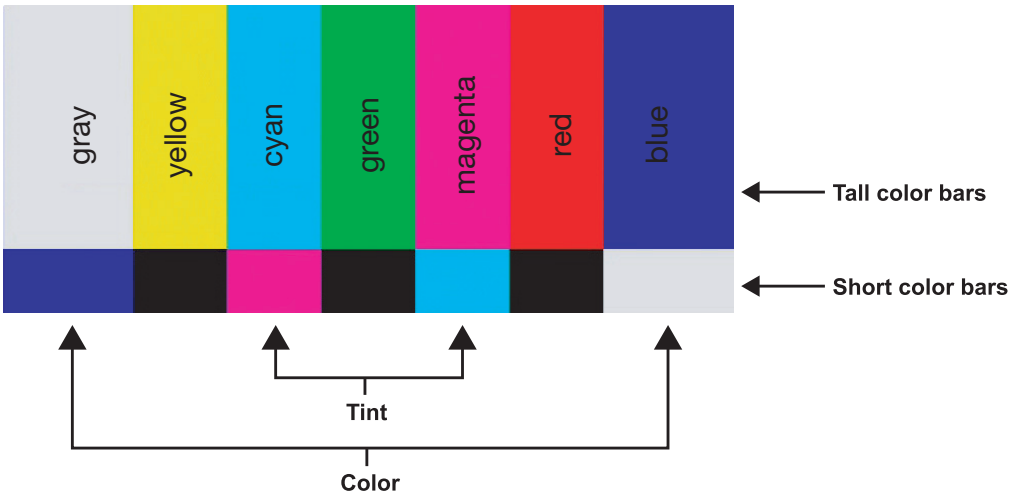
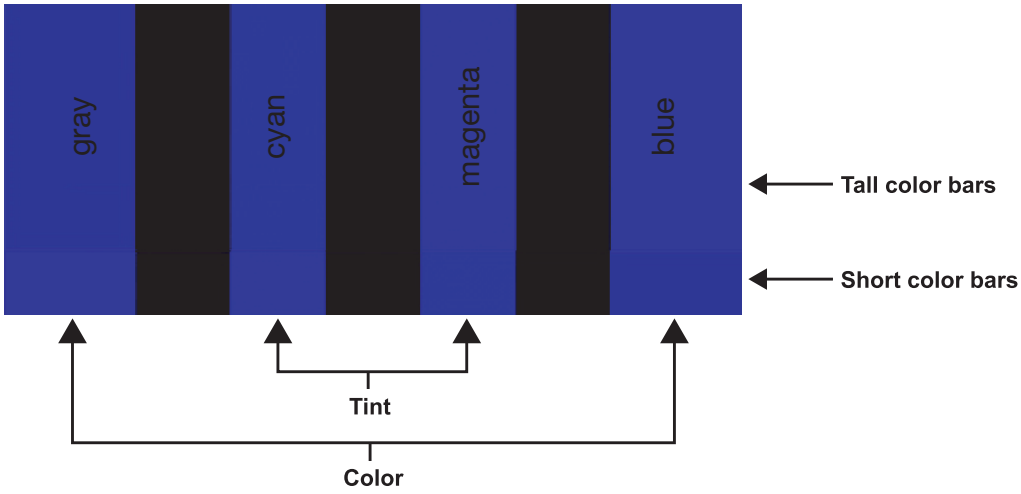


Figure 4-4. Typical Color Bar Pattern for Adjusting Color Saturation and Tint

Select Color from the Picture Adjust menu and press **ENTER**. While looking at the color bar pattern through a blue filter, adjust the color saturation level until the outermost (gray and blue) color bars appear to be a single shade of blue:



Tint: Tint or "hue" is essentially the ratio of red to green in the color portion of the image. When tint is decreased, the image appears redder; when it is increased the image appears greener. To set the tint, select Tint from the Adjustment menu and press **ENTER**. While looking at the color bar pattern through a blue filter, adjust the tint level until the cyan and magenta color bars (on either side of the green bar) appear to be a single shade of blue.

Note

Like the Brightness and Contrast controls, the color and tint controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Sharpness: "Sharpness" is the amount of high-frequency detail in the image. To adjust sharpness, select Sharpness from the Picture Adjust menu and press **ENTER**. On your external test pattern source, select a pattern like the one shown in Figure 4-5. Adjust as needed, looking for white edges around the transitions from black to gray and differently-sized lines in the "sweep" patterns at the top and bottom. Lower the sharpness setting to eliminate them.

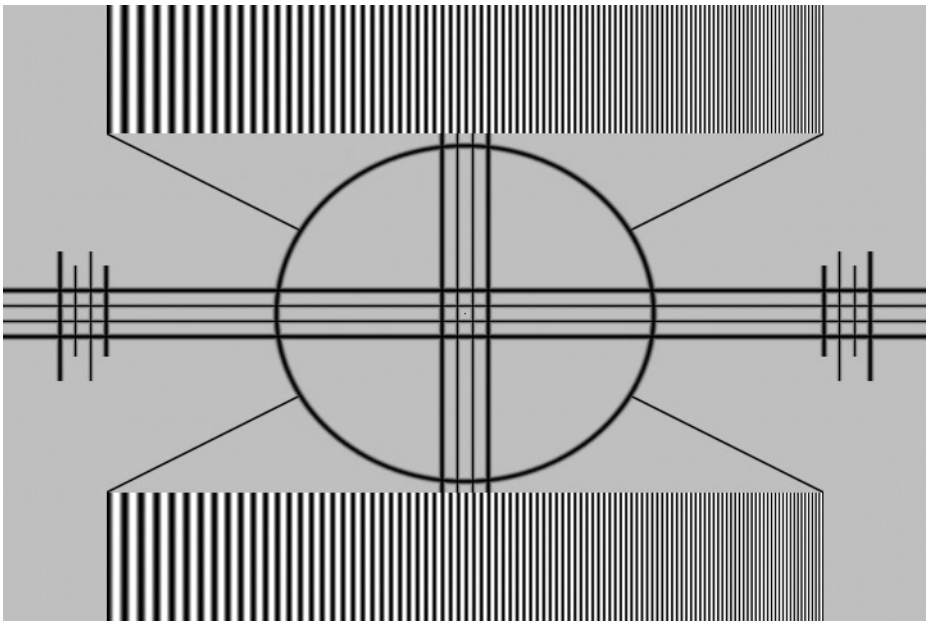


Figure 4-5. Typical Test Pattern for Adjusting Sharpness

Color Temperature: The RS-900 has five memory settings for Color Temperature:

Color Temperature
6500

- 5400 kelvins
- 6500 kelvins
- 9300 kelvins
- Custom 1
- Custom 2

Custom 1 and Custom 2 are installer-adjustable and can be used to create custom settings. There are six (6) adjustable "white balance" parameters available for the Custom 1 and Custom 2 settings (two each for red, green and blue). These are described later in this section; refer to ***White Balance*** on page 61.

Note

You must enter a passcode in order to enter the ISF menu.

Reset to Defaults: To reset all picture quality settings for the current input to their factory-default values, select Reset to Defaults from the Picture Adjust menu.

To change the aspect ratio (size and shape) of the projected image, select Aspect Ratio from the Main Menu and press **ENTER**. Select the appropriate aspect ratio for your screen size and the type of program material being viewed, then press **ENTER**; refer to Table 4-1.

◄ ***Aspect Ratio***

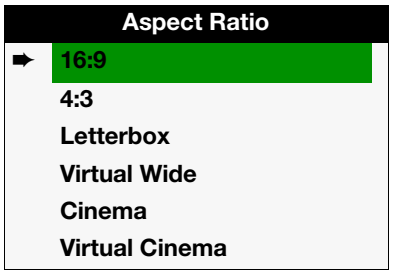


Table 4-1. Aspect Ratio Settings

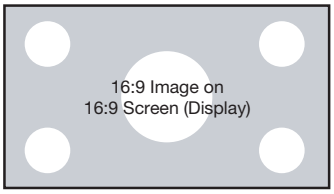
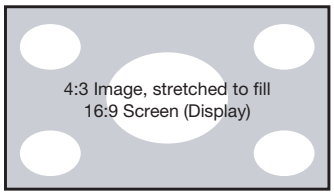
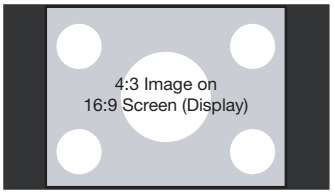
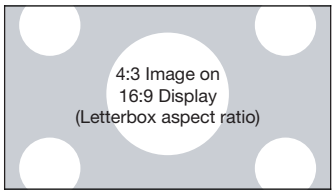
Aspect Ratio	Remote Control Key	Description	
16:9	16 : 9	 	Select 16:9 to view 16:9 DVDs and HDTV programs in their native aspect ratio. 4:3 images are stretched horizontally to fit a 16:9 screen.
4:3	4 : 3		4:3 scales the input signal to fit in the center of the 16:9 screen. 4:3 is the aspect ratio used by computer monitors, standard television programming and most VHS video cassettes.
Letterbox	LBOX		Letterbox mode scales (zooms in on) a 4:3 image linearly (by the same amount on all sides) to fill a 16:9 display. Letterbox is best suited for viewing LaserDisc movies or non-anamorphic DVDs on a 16:9 screen.

Table 4-1. Aspect Ratio Settings (continued)

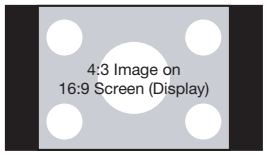
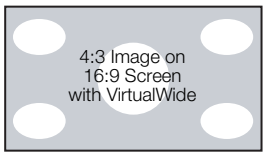
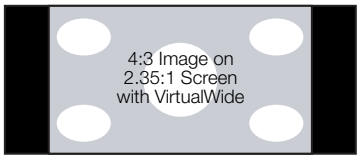
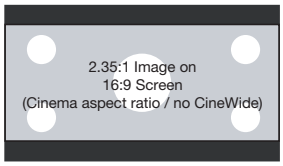
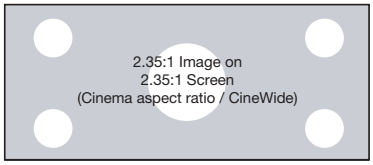
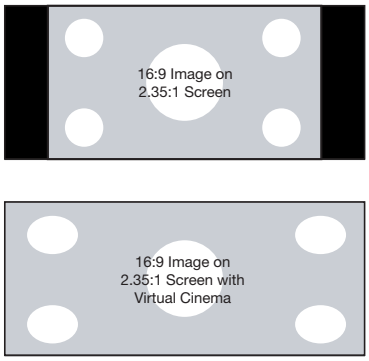
Aspect Ratio	Remote Control Key	Description	
VirtualWide	VWIDE	  	VirtualWide scales a 4:3 image NON-linearly (more on the sides than in the center) to fit a 16:9 screen. On a 2.35:1 screen, the image is centered between black bars on either side.
Cinema	CINEMA	 	Select Cinema to view 2.35 source material in its native aspect ratio. With a 16:9 screen and a non-CineWide projector (no anamorphic lens), the upper and lower portions of the screen are masked, but the geometry of the active image area is unchanged. With a 2.35:1 screen and a CineWide-equipped projector, the video processor scales the 2.35:1 image so that the active image area fills the 16:9 chip surface, eliminating the black bars. The secondary, anamorphic lens then restores the proper geometry to the 2.35:1 image.

Table 4-1. Aspect Ratio Settings (continued)

Aspect Ratio	Remote Control Key	Description	
Virtual Cinema	VCINE		A 16:9 image is scaled NON-linearly (more on the sides than in the center) to fit a 2.35:1 screen. Virtual Cinema is available only on RS-900 projectors equipped with the CineWide option.

To access the Installation adjustments, press **MENU**, then press the ▲ or ▼ button to highlight Installation and press **ENTER**. The Installation sub-menu appears. Press **EXIT** to return to the previous menu or press **MENU** to close all menus.

Note

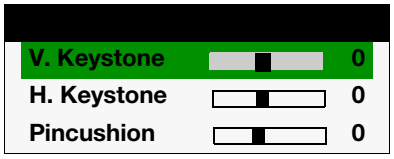
*When you change a setting in the Installation menu, the change takes effect immediately; you do not need to press **ENTER** afterwards. (Press **EXIT** to return to the previous menu or **MENU** to exit.)*

Language: Press the ◀ or ▶ button to select from the available languages: English, French, Spanish, German and Italian.

Orientation: Press the ◀ or ▶ button to change the orientation of the projected image. The RS-900 can be installed on a ceiling or in a rear-screen configuration with one or more mirrors. There are four settings: Floor Front, Ceiling Front, Floor Rear and Ceiling Rear.

◀ ***Installation***

Installation	
Language	English
Orientation	Floor Front
GeoCorrection	>
Overscan	0
Blue Image	Off
Sleep Timer	Off



GeoCorrection: Projector placement and other factors can cause geometric distortion in the projected image. To correct this, select GeoCorrection from the Installation menu. This sub-menu provides the following options:

- **V. Keystone/H. Keystone:** To correct distortion resulting from the angle of projection, select V. Keystone or H. Keystone from the GeoCorrection menu and use the ◀ or ▶ button to make the image rectangular. See Figure 4-6.

Runco recommends that the keystone feature not be used unless absolutely necessary, as it may cause artifacts in the image.

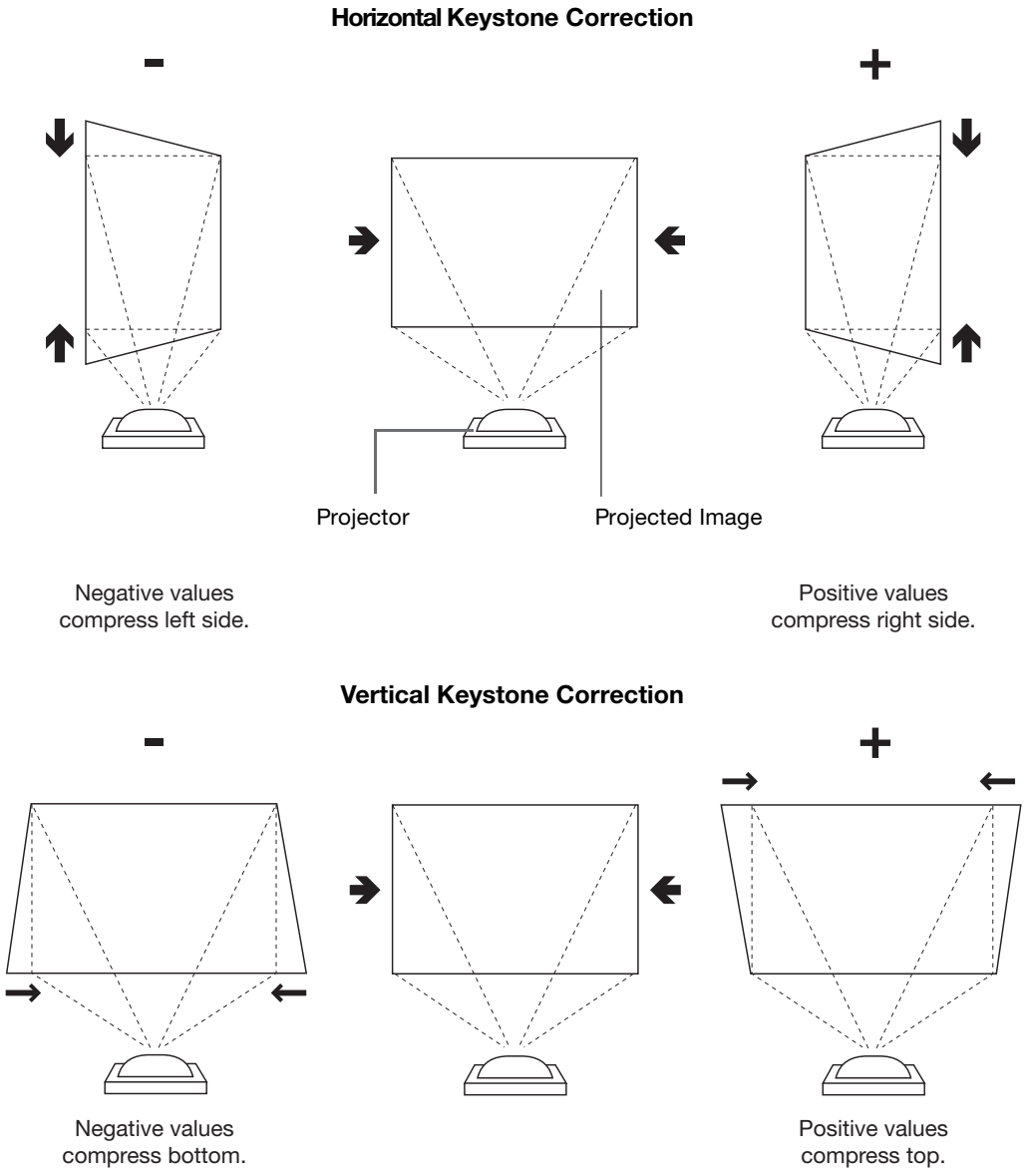


Figure 4-6. Keystone Correction

- **Pincushion:** “Pincushion” distortion can sometimes occur if the throw distance is very short and/or the projector is equipped with an anamorphic lens (refer to ***Installing and Adjusting the CineWide Anamorphic Lens*** in Section 3). To correct it, select Pincushion from the GeoCorrection menu and use the ◀ or ▶ button to make the image rectangular. See Figure 4-7.

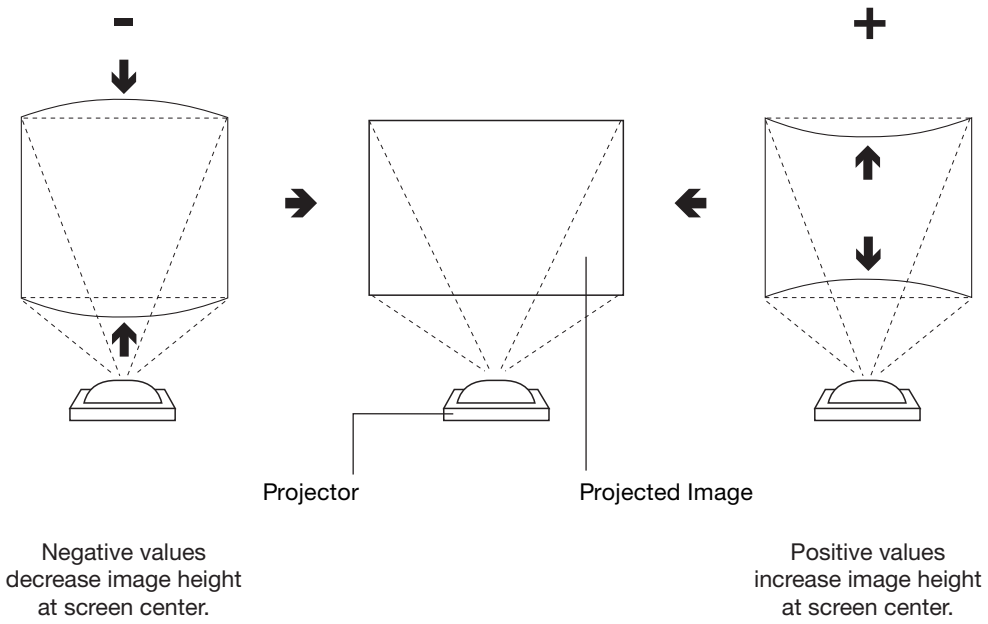


Figure 4-7. Pincushion Correction

Overscan: Overscan pushes the outside edge of the active picture area of the video signal out beyond the edge of the display area.

Some television programs are produced based on the assumption that older television sets may not display the outer edges of the broadcast picture area. Overscan effectively trims away these inactive, outer edges and enlarges the remaining portion of the image to fill the display area.

Use the on-screen slidebar to select the desired amount of over scan.

For HDTV, DVDs and other video sources, overscan is generally not necessary or desirable.

HD & RGB Adjust: Use the settings in the HD & RGB Adjust menu to fine-tune 480p and higher-resolution signals for optimum picture quality.

- **Auto:** Adjusts the phase, frequency and position automatically.
- **Frequency:** Adjusts the frequency of the signal.
- **Phase:** Adjust the phase if the image (usually from an RGB source) shows shimmer or "noise." Pixel phase adjusts the phase of the pixel sampling clock relative to the incoming signal. The effect of this control is similar to that of a tracking control on a VCR.

  For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar "half on, half off" graphic image. (You may find that you can stabilize the image at more than one point. Use either setting in this case.)
- **H. Position:** Adjusts the horizontal position of the image.
- **V. Position:** Adjusts the vertical position of the image.

OSD Setup: Choose OSD Setup from the Installation menu to change the behavior or appearance of the OSD menus.

- **OSD Timer:** Use the ◀ or ▶ button to set the OSD Timer. This timer controls how long the menus remain on-screen after selecting them. Select from 0 to 60 seconds, in 3-second increments. When you set the OSD Timer to 0, the menus remain on-screen until you hide them by pressing **MENU**.
- **OSD Position:** To adjust the horizontal and vertical position of the OSD, press the ▲ or ▼ button to select H. Position or V. Position and use the ◀ or ▶ button to adjust. Blue Image

Press the ◀ or ▶ button to turn the Blue Image Off or On. This feature removes all red and green color information from the image (simulating a blue filter), and is useful for color-calibrating the projector or other video components.

Sleep Timer: The Sleep Timer automatically puts the projector into standby mode after the amount of time you specify here. (A warning appears on-screen one minute before this is to occur.)

Use the ◀ or ▶ button to set the timer for anywhere from 30 minutes to 6 hours, in 30-minute increments. To disable the Sleep Timer, set it to 0.

➤ *Information*

Select Information from the Main Menu to see projector status information: the currently-active source, input signal resolution, aspect ratio, picture memory and lamp usage. This menu also displays the projector serial number.

Should you ever need to contact Runco Technical Support, this information will help them answer your questions or resolve product performance issues.

You can also press INFO on the RS-900 remote control unit (Figure 2-4) to display this information.

Information	
Source	HDMI 1
Resolution	1920x1080
Aspect Ratio	16:9
Picture Memory	ISF Night
Lamp Hours	450
Serial	RUP900RS0735001

➤ *Setup*

To access advanced projector settings, use the up- or down-arrow keys to highlight Setup and press **ENTER**. Use the number buttons on the remote to enter the Setup menu passcode when prompted and press **ENTER** again. Then, press **MENU** on the remote control.

Setup	
Lamp Power	200 Watts
Lamp Hours	>
Fan Mode	Normal
Background Color	Black
PIP	Off
RVR	0
12-volt Trigger	Normal
V. Correction	0
Amplitude	>
Auto Off	0
Default	

Note *You only need to enter the Setup menu passcode the first time you select that menu after turning on the projector.*

Lamp Power: Select Lamp Power from the Setup Menu to adjust the lamp output level. You can choose to run the lamp as bright as possible (200W; this is the default setting) or you can choose the lower (170W) setting. Generally, lower lamp output prolongs the life of the lamp, but decreases brightness.

Lamp Hours: When you replace the projector lamp (refer to ***Lamp Replacement*** on page 65), you should also reset the lamp timer. To do this, select Lamp Hours from the Setup menu. Press the right-arrow key on the remote to highlight “Yes,” then press **ENTER** to confirm the reset.

Note *Reset the Lamp Timer ONLY after you replace the lamp. Otherwise, the reported “Lamp Hours” will be inaccurate.*

WARNING *Do not exceed the recommended lamp life of 2000 hours. An old lamp becomes increasingly fragile and prone to sudden failure.*

Fan Mode: Select Fan Mode from the Setup Menu to control the operation of the projector's cooling fan.

In most cases, the default Fan Mode (Normal) will maintain the correct operating temperature. If the lamp frequently turns off due to overheating, or in certain high-altitude operating environments, you may need to change this setting to Hi. Altitude or Manual.

To manually set the fan speed, select Manual and press **ENTER**. Then, use the on-screen slidebar to adjust the speed.

Background Color: Press the ◀ or ▶ button to select the image Background Color (black, blue or gray). The Background Color appears when no incoming signal is present.

PIP: To enable or disable the picture-in-picture (PIP) feature, highlight PIP in the Setup menu and press ◀ or ▶ to select On or Off.

RVR: Use the RVR control to increase or decrease the Reflectance Volume Regulation setting. RVR lets you control the aperture or iris size (the physical opening through the lens; similar to an "f-stop" on a camera). Doing so allows you to optimize brightness and contrast according to the amount of ambient light in the viewing area.

Use a higher setting for rooms with a lot of ambient light. Use a lower setting for more "theater-like" viewing conditions (little or no ambient light).

12-volt Trigger: Select 12-volt Trigger from the Setup menu to configure the 12-volt trigger output.

- Set the 12-volt Trigger to Normal if you want the trigger to activate when the projector is turned on (for instance, if the trigger is controlling a retractable screen).
- Set the 12-volt Trigger to Cinema if you want the trigger to activate when the Cinema or Virtual Cinema aspect ratio is selected. Choose this setting if your RS-900 is equipped with the Runco CineWide with AutoScope system.

V. Correction: To achieve the proper image geometry with the secondary anamorphic lens, select V. Correction from the Set Up menu. Then, use the ◀ or ▶ button to change the native aspect ratio of the display, in small increments.

Amplitude: The Amplitude menu allows you to fine-tune the aspect ratio by stretching it horizontally or vertically, in small increments. This can be useful if your projector is equipped with an anamorphic lens, or if artifacts are visible at the image edges.

The Horizontal control adjusts the image width while keeping the height constant. Similarly, the Vertical control adjusts the image height while keeping the width constant.

Auto Off: When using the RS-900 with a computer, use the **Auto Off** feature to have the RS-900 go into standby mode when no source signal is present on the current input. (A warning message appears on-screen for approximately eight seconds before this occurs.) Select an Auto-Off interval of from five to 30 minutes, in five-minute increments. To return to normal operating mode from the Auto Off standby mode, select the input with the remote control or operate your computer.

When **Auto Off** is disabled, the RS-900 remains in normal operating mode, regardless of the presence or absence of an input sync signal.

Note

1. *If the computer is turned off or not properly connected to the RS-900, the system is set to the off state.*
2. *For instructions on using the computer's power management features, refer to the instructions for your computer.*

Default: To restore all Setup Menu options to their factory-default values, select Default and press the ▶ button to highlight "Yes." Then, press **ENTER**.

To access the ISF Calibration menu, select ISF from the Main Menu and press **ENTER**. Use the number buttons on the remote control to enter the ISF Calibration menu passcode when prompted and press **ENTER** again. Then, press **MENU** on the remote control.

◀ ***ISF***

ISF	
Picture Memory	ISF Night
Copy Settings	>
Brightness	50
Contrast	50
Color	50
Tint	0
Sharpness	5
Color Temperature	6500
White Balance	>
Advanced Options	>
Reset to Defaults	

Note

This menu should be used by ISF-certified technicians only.

Picture Memory/Copy Settings: These settings are described in the ***Picture Adjust*** section (page 48).

Brightness/Contrast/Color/Tint/Sharpness/Color Temperature: These settings are described in the ***Picture Adjust*** section (refer to page 48).

White Balance: To remove any trace of color from the white areas of the projected image, select the "Custom 1" or "Custom 2" Color Temperature. Then, choose White Balance from the ISF menu and press **ENTER**.

- **Gain:** Use the Gain controls to correct color imbalances in the bright areas of the image. A good way to do this is to use a test pattern consisting mostly of solid white areas, such as an 80 IRE "window" pattern. If the white areas contain traces of red, green or blue, decrease the Gain for that color.
- **Offset:** Use the Offset controls in the White Balance sub-menu to correct color imbalances in the dark areas of the image. A good way to do this is to use a test pattern consisting mostly of dark gray areas, such as a 30 IRE "window" pattern. If the gray areas contain traces of red, green or blue, decrease the Offset for that color.

  The Gain controls increase or decrease the full-scale input range; the Offset controls shift the entire range, resulting in a change in brightness. Figure 4-8 shows how the Gain and Offset controls interact with each other.

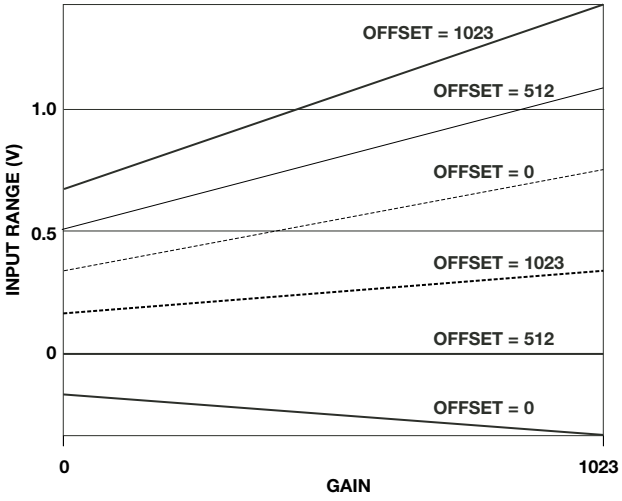


Figure 4-8. Gain and Offset

Note

Generally, higher Gain settings reduce the image contrast; higher Offset settings reduce the image brightness.

Advanced Options: For more precise control over picture quality, select Advanced Options from the ISF menu and press **ENTER**.

- **Image Enhance:** The Image Enhance menu gives you options for improving the quality of standard-definition, 480i images. (For 480p and higher-definition images, the controls in this menu are disabled.) Keep in mind that these controls add frequencies that are not present in the original signal, and may make images appear “noisy” if misused.
  - **DNR:** Use the ◀ or ▶ button to adjust the Digital Noise Reduction (DNR). DNR is useful for clearing up noisy images from interlaced SD sources. Adjust as desired, keeping in mind that reducing noise (which reduces high frequencies) may also soften the image.
  - **Detail Enhance:** Use the Detail Enhance control to improve the apparent horizontal and/or vertical resolution of the image.
  - **Luma Enhance:** Use the Luma Enhance control to improve the apparent brightness of the image.
  - **Chroma Enhance:** This control adds chroma (color information) to the input signal and can make colors appear more vibrant and saturated.
- **Black Threshold:** This control compensates for incoming elevated black levels present in certain video signals, and ensures that blacks in the display are neither “crushed” (where dark grays appear black) nor excessively elevated (where blacks appear dark gray). By default, the projector automatically determines the best setting according to the type of incoming video signal:
  - **0 IRE:** Used for DVD output with “enhanced black,” SECAM, most PAL standards and Japanese NTSC.
  - **7.5 IRE:** Used for most NTSC video signals.

  For some types of video, you may want to override the setting. Generally, if black appears crushed when brightness = 30, choose “0 IRE.” If black appears excessively elevated, use “7.5 IRE.”
- **Gamma Selection:** The normal gamma setting of 2.2 is correct for almost all signals and conditions. If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This will improve contrast while maintaining good details for blacks. Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the setting. Again, good gamma improves contrast while maintaining good details for blacks and whites.

- **Advanced Color Enhance (ACE):** Use the Advanced Color Enhance (ACE) controls to customize the stored color space characteristics. To do this, use the ◀ or ▶ button to select a component color (Red, Green, Blue, Yellow, Cyan or Magenta).

  For each component color, you can adjust the following:

  - **Limit:** This slidebar adjusts the intensity – also known as *luminance* – of a given color.
  - **Saturation:** This slidebar adjusts the color saturation level – the amount of that color in a video image. Lower settings produce less saturated colors; a setting of "0" removes that color from the image entirely. If the saturation is too high, that color will be overpowering and unrealistic.

  To restore the color space settings to their factory-default values, select Reset to Defaults and press **ENTER**.

- **Gamut:** Under most conditions, the White Balance and Advanced Color Enhance (ACE) controls in the Calibration menu are adequate for producing accurate and realistic colors from a variety of sources.

  In rare cases, though, you may need more precise control over the RS-900 display color gamut (range). For example, you may require a unique color gamut for a given projector or application.

  The RS-900 enables you to define the precise hue of each primary color component (white, red, green and blue) used to generate the millions of colors produced in displays. You do this by specifying x/y coordinates and luminance values for each primary color component.

  The x and y coordinates for each color define its location on the standard CIE chromaticity graph, shown in Figure 4-9. (CIE stands for "Commission Internationale de l'Éclairage" (International Commission on Illumination), the organization responsible for color measurement and management standards.)

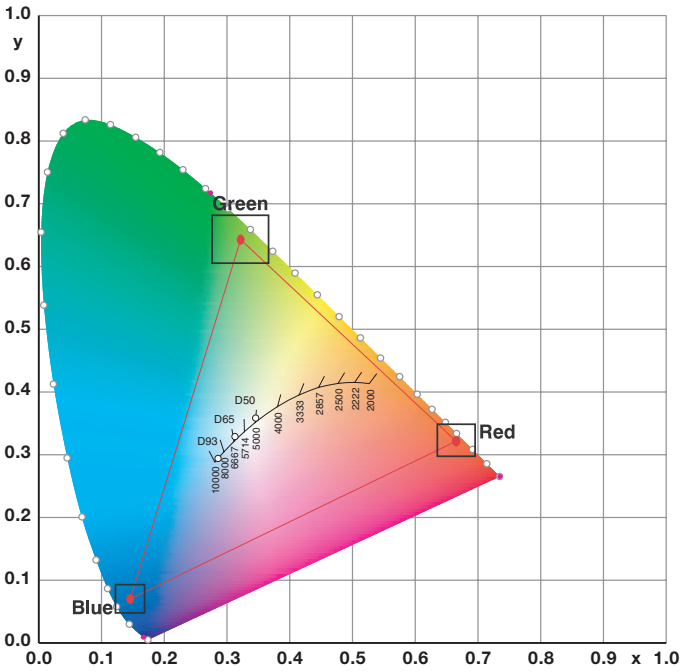


Figure 4-9. CIE 1931 Chromaticity Diagram

Changing either or both of these numbers changes the hue of the color and relocates the “triangle” for possible colors. For example, changing the x/y coordinates for red moves the color closer to either orange or violet, which in turn affects all displayed colors having a red component.

Note

To perform these adjustments, you will need a color analyzer (Sencore ColorPro 5000 software and ColorPro III sensor, or equivalent).

To adjust the gamut:

Gamut			
Settings			**Manual**
White	**x:312**	**y:329**	**Y:045**
Red	**x:640**	**y:330**	**Y:015**
Green	**x:300**	**y:600**	**Y:022**
Blue	**x:150**	**y:060**	**Y:018**
D. White	**x:312**	**y:329**	**Y:045**
Enter			
Save			
Color Temp.			**6500**

1. Select Gamut from the Advanced Options menu and press **ENTER**.
2. To do an automatic gamut adjustment, highlight “Enter” and press **ENTER**. If further calibration is necessary, continue with the next step.
3. Highlight “Settings” and press ◀ or ▶ to select “Manual.”
4. Highlight “White” and press **ENTER**. The RS-900 displays a white field on the screen.
5. Using the color analyzer, measure the x and y coordinates for about 15 seconds. Make a note of the results.
6. Press **EXIT** or **ENTER**.
7. Highlight “White” and press ▶.

White	**x:000**	**y:000**	**Y: 000**

8. Press **ENTER** to select the first digit of the x coordinate value for White (obtained in Step 5).
9. Press ▲ or ▼ repeatedly to set the digit.
10. Press ▶ to select the next digit; use the ▲ and ▼ buttons to change it.
11. Repeat Step 10 for the third digit.
12. Press **ENTER**.
13. Press ▶ to highlight the “y” coordinate value for White. Then, press **ENTER** to select the first digit.
14. Repeat Steps 9 through 12 to set the “y” coordinate value for White.
15. Press ▶ to highlight the “Y” coordinate value. Then press **ENTER** to select the first digit.
16. Repeat Steps 9 through 12 to set the “Y” coordinate value for White.
17. Press **EXIT**.
18. Repeat Steps 4 through 17 for Red, Green, Blue and D. White (Desired White).
19. Highlight “Save” and press **ENTER**.

To undo the effects of a previous calibration, highlight “Settings” and press ◀ or ▶ to select “Default.”

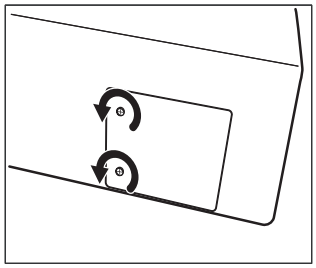
Reset to Defaults: To restore the ISF default image settings for the current input source ONLY, select Reset to Defaults and press the ▶ button to highlight “Yes.” Then, press **ENTER**.

5. Maintenance and Troubleshooting

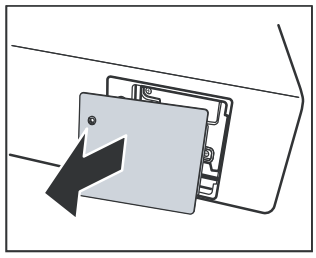
5.1 Lamp Replacement

The lamp should be replaced when it reaches the end of its life (typically 2000 hours), or sooner if a noticeable degradation in brightness occurs. Contact your Runco dealer to obtain a replacement lamp.

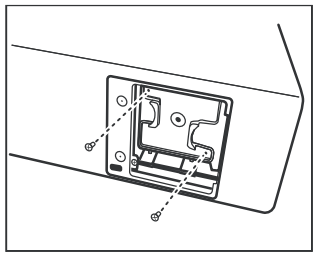
1. Turn off the projector and unplug the power cord. **Allow the projector to cool down for approximately 45 minutes prior to removing the lamp assembly for replacement.**
2. Loosen the two captive screws from the lamp cover.



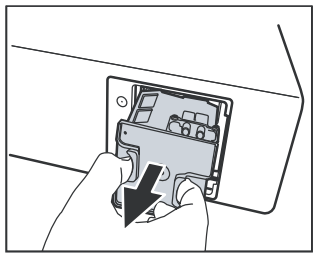
3. Remove the lamp cover.



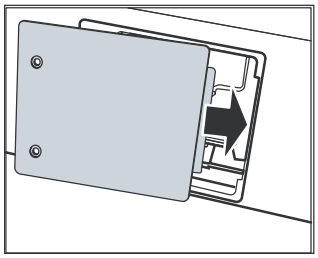
4. Remove the two lamp assembly mounting screws.



5. Grasp the lamp assembly handle and pull gently, removing the lamp module from the projector housing.
6. Install the new lamp module and replace the two screws.



7. Replace the lamp cover at the right side first and secure it with the two screws.
8. Turn on the power and select Lamp Hours from the Setup menu to reset the lamp timer (refer to ***Lamp Hours*** on page 59).



5.2 Troubleshooting Tips

Table 5-1 provides some general guidelines for troubleshooting problems you may encounter with the RS-900. If the suggested solutions fail to resolve the problem or if you encounter an issue not described here, please contact Runco Technical Support.

Table 5-1. Troubleshooting Chart

Symptom	Possible Cause(s)	Solution
The projector does not turn on.	• The RS-900 is not plugged in or the AC outlet is not active. • The main power switch (at the rear of the projector) is off. • Lamp cover is not securely attached.	• Ensure that the RS-900 is plugged in and that the AC outlet is active. • Turn on the power switch. • Securely attach the lamp cover.
The projector does not turn back on after it was powered off.	• The projector will not turn on for two minutes after power-off, to protect the lamp.	• Wait until the RS-900 completes its cool-down (POWER LED lights solid orange).
The remote control does not work correctly.	• The batteries have run out.	• Replace the batteries.
The projector is on and OSD menus appear, but there is no video image on-screen.	• Incorrect source selection. • Source component is not turned on. • Source component is connected incorrectly or not at all.	• Select the correct source. • Turn on the source. • Check cable connection from source component to projector.
A projected image from a DVD is split or otherwise scrambled.	• DVD player is connected to the Component input and set to progressive scan mode.	• Turn off progressive scan on the DVD player.
Image is blurred.	• The lens is not correctly focused.	• Adjust the focus with the remote control.
Image is too bright and/or lacks definition in the bright areas of the image.	• Contrast is set too high.	• Lower the contrast setting.
Image appears “washed out” and/or dark areas appear too bright.	• Brightness is set too high.	• Lower the brightness setting.
Colors in the image are swapped; for example, reds appear blue or vice versa.	• The Red/Pr, Green/Y or Blue/Pb outputs from the source are connected to the wrong inputs on the RS-900.	• Ensure that the source outputs are connected to the correct RS-900 input.
POWER LED lights solid red.	• Internal failure.	• Please contact your Runco dealer for assistance.
LAMP LED lights solid red.	• The lamp has failed or exceeded its usage life.	• Replace the lamp with a new one.

Table 5-1. Troubleshooting Chart (continued)

Symptom	Possible Cause(s)	Solution
TEMP LED lights solid red.	• RS-900 internal temperature is too high or one or more fans have failed.	• Power off the RS-900 and allow it to cool down. Ensure that the intake and exhaust vents are not blocked. Turn the projector back on. If the problem persists, please contact your Runco dealer for assistance.

Notes:

6. Serial Communications

6.1 RS-232 Connection and Port Configuration

To interface the RS-900 with a home theater automation/control system or a PC running terminal emulation software:

1. Connect it to your control system or PC as shown in Figure 3-14.
2. Start a terminal session on your PC using a terminal-emulation program, such as HyperTerminal.
3. Configure the RS-232 controller or PC serial port as follows: no parity, 8 data bits, 1 stop bit and no flow control. Set the baud rate to 19200.
4. Type a command from among those listed in Table 6-1. For example, to select the Component 1 input, type `X133X`.

6.2 Serial Command Syntax

Serial commands to the RS-900 take the following form:

- Commands are in ASCII format.
- Commands must be in `UPPERCASE`; for example, `X001X`, **not** `x001x`.
- When you enter a valid command, the RS-900 executes it and echoes the command back to the PC or control system. For example, when you send the command `X001X`, the RS-900 responds with `X0_001X<CR>`.
- When you enter an invalid command, the RS-900 simply ignores it.

Note

The RS-900 will not accept serial commands for 20 seconds after it is turned on or off.

Table 6-1. Serial Commands

Code	Function
X001X	Power On
X002X	Power Off
X003X	Menu
X004X	Enter
X005X	Exit
X006X	Up (arrow key)
X007X	Down (arrow key)
X008X	Left (arrow key)
X009X	Right (arrow key)
X011X	Show active source and aspect ratio information

Table 6-1. Serial Commands (continued)

Code	Function
X021X	Keypad 1
X022X	Keypad 2
X023X	Keypad 3
X024X	Keypad 4
X025X	Keypad 5
X026X	Keypad 6
X027X	Keypad 7
X028X	Keypad 8
X029X	Keypad 9
X030X	Keypad 0
X041X	Restore image settings from Custom 1
X042X	Restore image settings from Custom 2
X043X	Restore image settings from ISF Day
X044X	Restore image settings from ISF Night
X051X	Set Gamma to 2.2
X047X	Restore all Picture Adjust Menu options to their factory-default values
X048X	Restore all Setup Menu options to their factory-default values
X049X	Restore all ISF Menu options to their factory-default values
X056X	Increase PIP sub-window size
X057X	Decrease PIP sub-window size
X058X	Set PIP active window
X059X	Set PIP on
X060X	Set PIP off
X061X	16:9 aspect ratio
X062X	4:3 aspect ratio
X063X	Letterbox aspect ratio
X064X	VirtualWide aspect ratio
X065X	Cinema aspect ratio
X066X	Virtual Cinema aspect ratio
X082X	Image orientation = floor front
X083X	Image orientation = ceiling front

Table 6-1. Serial Commands (continued)

Code	Function
X084X	Image orientation = floor rear
X085X	Image orientation = ceiling rear
X091X	Lamp Power = 170W
X092X	Lamp Power = 200W
X100X	Black Threshold = 0 IRE
X101X	Black Threshold = 7.5 IRE
X112X	Color Temperature = 5400K
X113X	Color Temperature = 6500K
X114X	Color Temperature = 9300K
X115X	Color Temperature = Custom 1
X116X	Color Temperature = Custom 2
X121X	OSD Language = English
X122X	OSD Language = French
X123X	OSD Language = Spanish
X124X	OSD Language = German
X125X	OSD Language = Italian
X131X	Switch to Composite input
X132X	Switch to S-Video input
X133X	Switch to Component 1 input
X134X	Switch to Component 2 input
X135X	Switch to HDMI 1 input
X136X	Switch to HDMI 2 input
X137X	Switch to RGBHV input
X151X	Reset Lamp Timer
X156X	Background Color = Blue
X157X	Background Color = Gray
X158X	Background Color = Black
X180X	Blue Image ON
X181X	Blue Image OFF

Notes:

7. Specifications

7.1 RS-900 Specifications

Table 7-1 lists the RS-900 specifications.

Table 7-1. RS-900 Specifications

Projector Type:	Digital Light Processing (DLP), Single-Chip SuperOnyx DMD
Native Resolution:	1920 x 1080 (16:9)
Aspect Ratios:	4:3, Letterbox, 16:9, VirtualWide, Cinema, Virtual Cinema
Video Standards:	NTSC, PAL, ATSC
Video Compatibility:	480i, 480p, 576i, 576p, 720p, 1080i, 1080p
Scan Frequency:	Horizontal: 15 - 80 kHz Vertical: 50 - 100 Hz
Picture Size (16:9 Screen):	Recommended Width: 72 in. (1.83 m) to 96 in. (2.44 m)
Throw Distance (Factor x Screen Width):	Refer to Table 3-3
Vertical Offset (when projector is inverted):	Up = 40% of screen height above lens center (80% of one half of the screen height) Down = 60% of screen height below lens center (120% of one half of the screen height)

Table 7-1. RS-900 Specifications (continued)

Brightness and Contrast:	**Cinema Standards Measurement System (CSMS) Specifications** - Brightness*: 13.9 to 19.8 foot-Lamberts (fL) - Contrast Ratio*: 200:1 to 220:1 *Variable depending on RVR setting These measurements are taken from the projector in a controlled, home theater environment. All measurements are made to ANSI/NAPM IT7.228-1997 specifications using the Photo Research PR-650 SpectraColorimeter and Minolta LS-100 Luminance Meter, Video Essentials test DVD and a 1.3 gain, 72-inch wide screen. The projector is calibrated to a color temperature of 6,500K and has a minimum of 150 hours of usage. The foot-Lambert (fL) is the unit of measurement used in commercial movie theaters to express image brightness at the screen surface. The Society of Motion Picture and Television Engineers (SMPTE) specifies 16 fL as the target image brightness for film-based projectors using an open gate (without film in the projector). More importantly, today SMPTE specifies 12 fL as the target image brightness in Digital Cinema theaters. The foot-Lambert measurement is dependent on screen size, screen gain and projector light output. **Home Theater Calibration Specifications** - Light Output: 438 to 543 ANSI Lumens - Contrast Ratio*: 200:1 to 220:1 These specifications are obtained by calibrating the projector as described above for CSMS measurements. **Industry-Standard Specifications** - Light Output: 1200 ANSI Lumens - Contrast Ratio: 3000:1 These are typical projector brightness and contrast specifications found in most companies' sales literature. Runco includes these measurements in its literature to allow for direct comparison with other manufacturers' projectors. These measurements are typically taken at 9,000K to 13,000K to get expected performance data when the projector is used in professional, commercial and industrial displays.
Lamp:	200 Watts
Estimated Lamp Life:	2000 hours
Video Inputs:	(1) Composite Video, (1) S-Video, (1) RGB/Component Video (5 x BNC), (1) RCA Component Video (3 x RCA), (2) HDMI
Control Options:	- Discrete IR remote - Serial commands via RS-232
RS-232 Communication Parameters:	115200 bps, no parity, 8 data bits, 1 stop bit, no flow control
+12V Output:	Max. 0.25 Amps, active when Cinema or Virtual Cinema Aspect Ratio is selected (CineWide versions only) or when projector is turned on; Tip = +12V; Sleeve = Ground
Power Requirements:	100 to 240 VAC (auto-sensing), 50/60 Hz, 340 Watts (1160.4 BTUs/hour)

Table 7-1. RS-900 Specifications (continued)

Operating Environment:	41°F to 95°F (5°C to 35°C), 20% to 80% humidity (non-condensing)
Dimensions:	**RS-900:** See Figure 7-1 **RS-900/CineWide:** See Figure 7-2 **RS-900/CineWide with AutoScope:** See Figure 7-3
Weight (without lens):	34 lbs. (15.42 kg)
Regulatory Approvals:	Complies with FCC Class B, CE, C-Tick, GOST, TUV-GS, cTUV-US
Limited Warranty:	Projector: Two (2) years parts and labor from the date of delivery to the end user. Lamp: 1000 hours or six (6) months, whichever comes first.
Specifications are subject to change without notice.	

7.2 RS-900 Dimensions

Figure 7-1 shows the RS-900 dimensions (all dimensions are in inches).

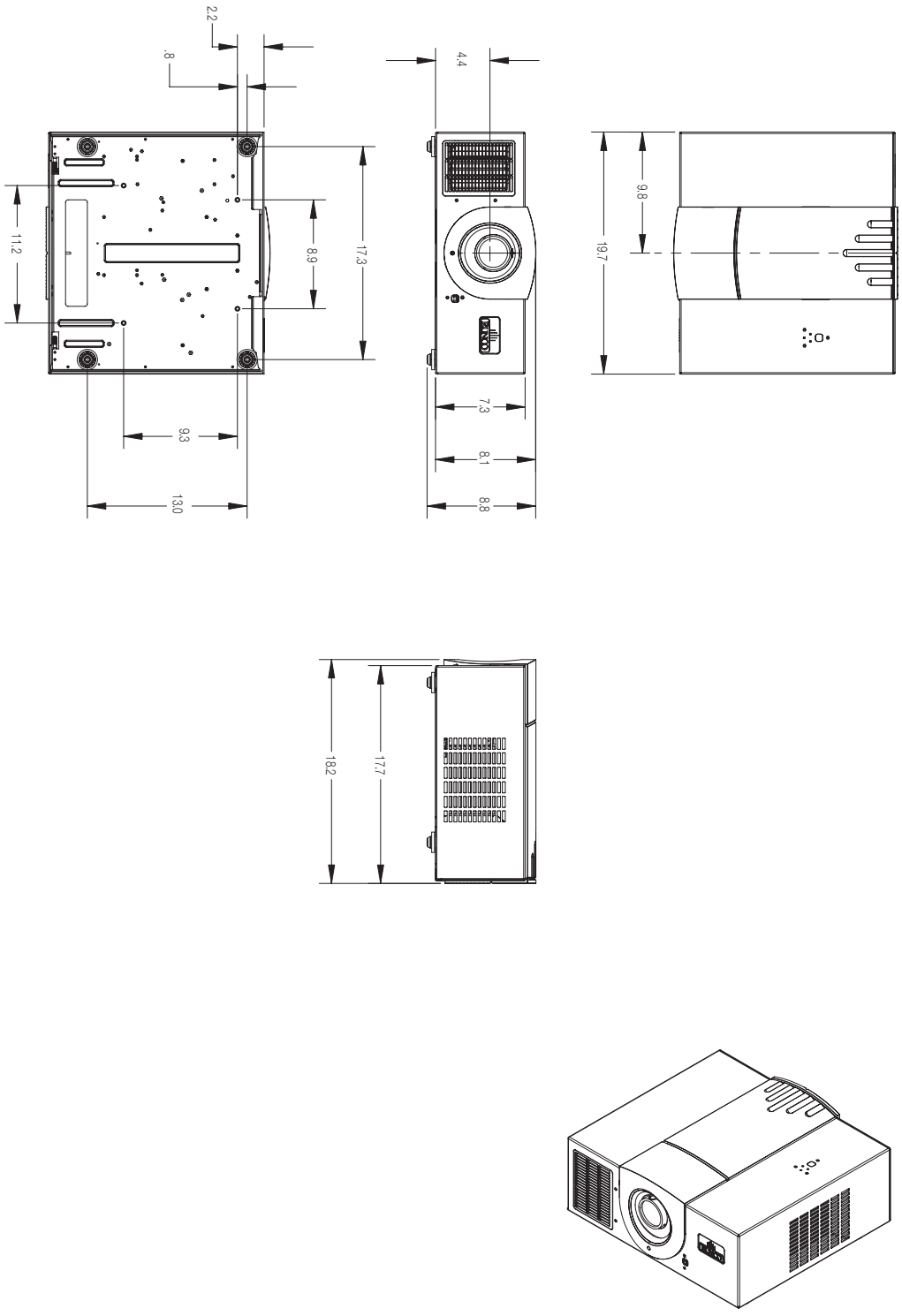


Figure 7-1. RS-900 Dimensions

7.3 RS-900/CineWide Dimensions

Figure 7-3 shows the RS-900/CineWide dimensions (all dimensions are in inches).

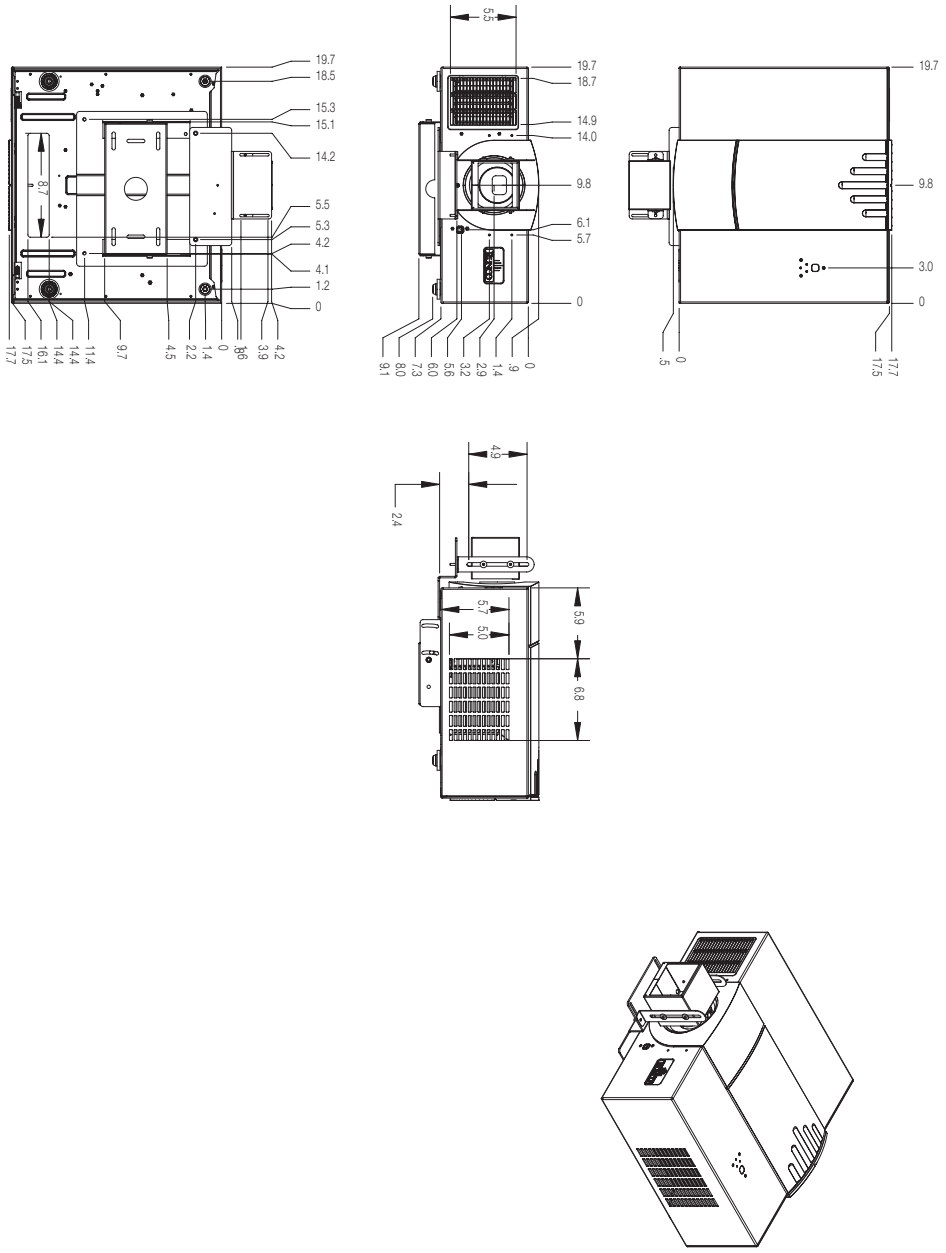


Figure 7-2. RS-900/CineWide Dimensions (with Whitney Anamorphic Lens)

7.4 RS-900/CineWide with AutoScope Dimensions

Figure 7-3 shows the RS-900/CineWide with AutoScope dimensions (all dimensions are in inches).

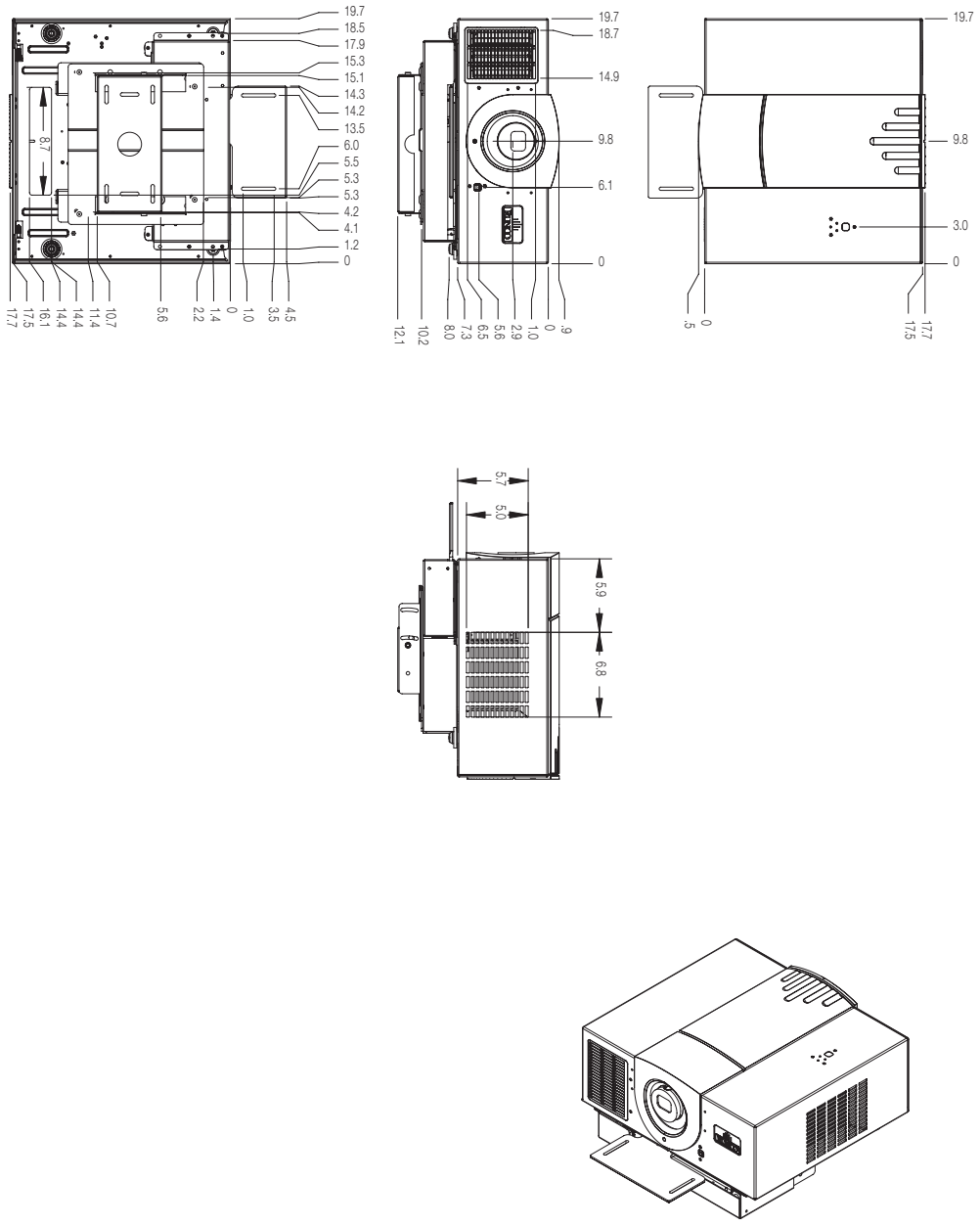


Figure 7-3. RS-900/CineWide with AutoScope Dimensions

7.5 Supported Timings

Table 7-2 lists the signal types supported by each input on the RS-900.

Table 7-2. Supported Signal Timings

Format	Resolution	Refresh Rate (Hz)	Horizontal Frequency (kHz)	Pixel Frequency (MHz)
Analog/Digital PC SIgnals (RGB HD / HDMI 1 / HDMI 2)				
720x350	720x350	70.00	31.469	28.322
720x400	720x400	70.00	31.469	28.322
		85.00	37.900	35.500
640x480	640x480	60.00	31.469	25.175
		72.00	37.861	31.500
		75.00	37.500	31.500
		85.00	43.269	36.000
800x600	800x600	50.00	31.300	32.051
		56.00	35.156	36.000
		60.00	37.879	40.000
		72.00	48.077	50.000
		75.00	46.875	49.500
		85.00	53.674	56.250
848x480	848x480	60.00	31.02	33.750
1024x768	1024x768	60.00	48.363	65.000
		70.00	56.476	75.000
		75.00	60.023	78.750
		85.00	68.677	94.500
1152x864	1152x864	75.00	67.500	108.000
1280x768	1280x768	60.00	47.396	68.250
		60.00	47.776	79.500
		75.00	60.289	102.250
		85.00	68.633	117.500
1280x960	1280x960	60.00	60.000	108.000
		85.00	85.938	148.500
1280x1024	1280x1024	60.00	63.981	108.000
		75.00	79.976	135.000
		85.00	91.146	157.500
1360x768	1360x768	60.00	47.712	85.500

Table 7-2. Supported Signal Timings (continued)

Format	Resolution	Refresh Rate (Hz)	Horizontal Frequency (kHz)	Pixel Frequency (MHz)
1400x1050	1400x1050	60.00	64.744	101.000
		60.00	65.317	121.750
		75.00	82.278	156.000
1440x900	1440x900	60.00	55.469	88.750
		60.00	59.935	106.500
		75.00	70.635	136.750
		85.00	80.430	157.000
1600x1200	1600x1200	60.00	75.000	162.000
1680x1050	1680x1050	60.00	64.674	119.000
		60.00	65.290	146.250
1920x1200	1920x1200	60.00	74.038	154.000
EDTV/HDTV Signals (HDMI 1 / HDMI 2 / Component 1 (YPbPr) / Component 2 (YPbPr or RGB))				
480/60i	720x487	59.94	15.734	13.500
480/60p	720x483	59.94	31.469	27.000
576/50i	720x576	50.00	15.625	14.750
576/50p	720x576	50.00	31.250	29.000
540/60p	1920x540	59.94	33.746	74.250
540/60p	1920x540	60.00	33.250	74.250
720/24p	1280x720	24.00	18.000	29.700
720/30p	1280x720	30.00	22.500	37.130
720/50p	1280x720	50.00	37.500	75.250
720/60p	1280x720	60.00	45.000	74.250
1080/50i	1920x1080	50.00	28.125/31.250	74.250/72.000
1080/60i	1920x1080	59.94/60.00	33.716/33.750	74.175/74.250
1080/24p	1920x1080	23.98/24.00	26.978/27.000	74.175/74.250
1080/48p	1920x1080	48.000	27.000	148.500
1080/25p	1920x1080	25.000	28.125	74.250
1080/30p	1920x1080	29.97/30.00	33.716/33.750	74.175/74.250
1080/50p	1920x1080	50.00	56.250	148.500
1080/60p	1920x1080	59.94/60.00	67.433/67.500	148.350/148.500

Table 7-2. Supported Signal Timings (continued)

Format	Resolution	Refresh Rate (Hz)	Horizontal Frequency (kHz)	Pixel Frequency (MHz)
SDTV Signals (Video / S-Video)				
NTSC 3.58	–	59.94/60.00	15.734/15.750	3.580
NTSC 4.43	–	59.94/60.00	15.734/15.750	4.430
PAL-B/G	–	50.00	15.625	4.430
PAL-M	–	59.94/60.00	15.734/15.750	3.580
PAL-N	–	50.00	15.625	3.580
PAL-60	–	59.94/60.00	15.734/15.750	4.430
SECAM	–	50.00	15.625	4.250/4.410

Notes:

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Runco International • 2900 Faber Street • Union City, CA 94587 • Ph (510) 324-7777 / (800) 23RUNCO / Fax (510) 324-9300
www.runco.com